Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Amesbury
City/Town

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.

Note: Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

A. General Information

1. Project Location (**Note:** electronic filers will click on button to locate project site):

79 High Street (a. Street Address) | Amesbury (b. City/Town) | 01913 (c. Zip Code)

Latitude and Longitude: 42.860267 (d. Latitude) | -70.937707 (e. Longitude)

Map 39 (f. Assessors Map/Plat Number) | Lot 2 (g. Parcel /Lot Number)

2. Applicant:

Robert (a. First Name) | Desmarais (b. Last Name)

City of Amesbury Public Works (c. Organization)

39 South Hunt Road (d. Street Address)

Amesbury (e. City/Town) | MA (f. State) | 01913 (g. Zip Code)

978-388-8116 (h. Phone Number) | 978-388-1769 (i. Fax Number) | rob@amesburyma.gov (j. Email Address)

3. Property owner (required if different from applicant): ☐ Check if more than one owner

(a. First Name) | (b. Last Name)

City of Amesbury (c. Organization)

62 Friend Street (d. Street Address)

Amesbury (e. City/Town) | MA (f. State) | 01913 (g. Zip Code)

978-388-8121 (h. Phone Number) | (i. Fax Number) | (j. Email address)

4. Representative (if any):

Stephanie (a. First Name) | Hanson (b. Last Name)

Comprehensive Environmental Inc. (c. Company)

21 Depot Street (d. Street Address)

Merrimack (e. City/Town) | NH (f. State) | 03054 (g. Zip Code)

603-424-0564 (h. Phone Number) | 603-424-8441 (i. Fax Number) | shanson@ceiengineers.com (j. Email address)

5. Total WPA Fee Paid (from NOI Wetland Fee Transmittal Form):

N/A (a. Total Fee Paid) | N/A (b. State Fee Paid) | N/A (c. City/Town Fee Paid)

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A. General Information (continued)

6. General Project Description:

Annual beach nourishment (as needed seasonally). See attached Narrative and Lake Gardner Beach Nourishment Plan (2019).

7a. Project Type Checklist: (Limited Project Types see Section A. 7b.)

1. ☐ Single Family Home
2. ☐ Residential Subdivision
3. ☐ Commercial/Industrial
4. ☐ Dock/Pier
5. ☐ Utilities
6. ☐ Coastal engineering Structure
7. ☐ Agriculture (e.g., cranberries, forestry)
8. ☐ Transportation
9. ☒ Other

7b. Is any portion of the proposed activity eligible to be treated as a limited project (including Ecological Restoration Limited Project) subject to 310 CMR 10.24 (coastal) or 310 CMR 10.53 (inland)?

1. ☐ Yes ☒ No

If yes, describe which limited project applies to this project. (See 310 CMR 10.24 and 10.53 for a complete list and description of limited project types)

2. Limited Project Type

If the proposed activity is eligible to be treated as an Ecological Restoration Limited Project (310 CMR10.24(8), 310 CMR 10.53(4)), complete and attach Appendix A: Ecological Restoration Limited Project Checklist and Signed Certification.

8. Property recorded at the Registry of Deeds for:

Essex a. County	b. Certificate # (if registered land)
08058 c. Book	0214 d. Page Number

B. Buffer Zone & Resource Area Impacts (temporary & permanent)

1. ☐ Buffer Zone Only – Check if the project is located only in the Buffer Zone of a Bordering Vegetated Wetland, Inland Bank, or Coastal Resource Area.
2. ☒ Inland Resource Areas (see 310 CMR 10.54-10.58; if not applicable, go to Section B.3, Coastal Resource Areas).

Check all that apply below. Attach narrative and any supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

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B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

For all projects affecting other Resource Areas, please attach a narrative explaining how the resource area was delineated.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☐ Bank	1. linear feet	2. linear feet
b. ☐ Bordering Vegetated Wetland	1. square feet	2. square feet
c. ☐ Land Under Waterbodies and Waterways	1. square feet 3. cubic yards dredged	2. square feet

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
d. ☐ Bordering Land Subject to Flooding	1. square feet 3. cubic feet of flood storage lost	2. square feet 4. cubic feet replaced
e. ☐ Isolated Land Subject to Flooding	1. square feet 2. cubic feet of flood storage lost	3. cubic feet replaced
f. ☒ Riverfront Area	1. Name of Waterway (if available) - specify coastal or inland: Powow River	

2. Width of Riverfront Area (check one):

☐ 25 ft. - Designated Densely Developed Areas only

☐ 100 ft. - New agricultural projects only

☒ 200 ft. - All other projects

3. Total area of Riverfront Area on the site of the proposed project: 41,603 square feet

4. Proposed alteration of the Riverfront Area:

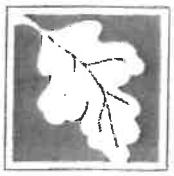
a. total square feet: 13,990 | b. square feet within 100 ft.: 3,170 | c. square feet between 100 ft. and 200 ft.: 10,820

5. Has an alternatives analysis been done and is it attached to this NOI? ☒ Yes ☐ No

6. Was the lot where the activity is proposed created prior to August 1, 1996? ☒ Yes ☐ No

3. ☐ Coastal Resource Areas: (See 310 CMR 10.25-10.35)

Note: for coastal riverfront areas, please complete **Section B.2.f.** above.



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B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

Check all that apply below. Attach narrative and supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

Online Users: Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☐ Designated Port Areas	Indicate size under Land Under the Ocean, below	
b. ☐ Land Under the Ocean	1. square feet 2. cubic yards dredged	
c. ☐ Barrier Beach	Indicate size under Coastal Beaches and/or Coastal Dunes below	
d. ☐ Coastal Beaches	1. square feet	2. cubic yards beach nourishment
e. ☐ Coastal Dunes	1. square feet	2. cubic yards dune nourishment
	Size of Proposed Alteration	Proposed Replacement (if any)
f. ☐ Coastal Banks	1. linear feet	
g. ☐ Rocky Intertidal Shores	1. square feet	
h. ☐ Salt Marshes	1. square feet	2. sq ft restoration, rehab., creation
i. ☐ Land Under Salt Ponds	1. square feet 2. cubic yards dredged	
j. ☐ Land Containing Shellfish	1. square feet	
k. ☐ Fish Runs	Indicate size under Coastal Banks, inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above 1. cubic yards dredged	
l. ☐ Land Subject to Coastal Storm Flowage	1. square feet	

4. ☐ Restoration/Enhancement
If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.2.b or B.3.h above, please enter the additional amount here.

a. square feet of BVW | b. square feet of Salt Marsh

5. ☐ Project Involves Stream Crossings

a. number of new stream crossings | b. number of replacement stream crossings

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C. Other Applicable Standards and Requirements

☐ This is a proposal for an Ecological Restoration Limited Project. Skip Section C and complete Appendix A: Ecological Restoration Limited Project Checklists – Required Actions (310 CMR 10.11).

Streamlined Massachusetts Endangered Species Act/Wetlands Protection Act Review

1. Is any portion of the proposed project located in **Estimated Habitat of Rare Wildlife** as indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage and Endangered Species Program (NHESP)? To view habitat maps, see the *Massachusetts Natural Heritage Atlas* or go to http://maps.massgis.state.ma.us/PRI_EST_HAB/viewer.htm.

a. ☒ Yes ☐ No **If yes, include proof of mailing or hand delivery of NOI to:**

Natural Heritage and Endangered Species Program
Division of Fisheries and Wildlife
1 Rabbit Hill Road
Westborough, MA 01581

8/1/2017
b. Date of map

If *yes*, the project is also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18). To qualify for a streamlined, 30-day, MESA/Wetlands Protection Act review, please complete Section C.1.c, and include requested materials with this Notice of Intent (NOI); *OR* complete Section C.2.f, if applicable. *If MESA supplemental information is not included with the NOI, by completing Section 1 of this form, the NHESP will require a separate MESA filing which may take up to 90 days to review (unless noted exceptions in Section 2 apply, see below).*

c. Submit Supplemental Information for Endangered Species Review*

1. ☒ Percentage/acreage of property to be altered:

(a) within wetland Resource Area — 13,990 square feet/0.321 acres (percentage/acreage)

(b) outside Resource Area — 0 (percentage/acreage)

2. ☒ Assessor's Map or right-of-way plan of site

2. ☒ Project plans for entire project site, including wetland resource areas and areas outside of wetlands jurisdiction, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work **

(a) ☒ Project description (including description of impacts outside of wetland resource area & buffer zone)

(b) ☒ Photographs representative of the site

* Some projects **not** in Estimated Habitat may be located in Priority Habitat, and require NHESP review (see http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/regulatory-review/). Priority Habitat includes habitat for state-listed plants and strictly upland species not protected by the Wetlands Protection Act.

** MESA projects may not be segmented (321 CMR 10.16). The applicant must disclose full development plans even if such plans are not required as part of the Notice of Intent process.

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C. Other Applicable Standards and Requirements (cont'd)

(c) ☒ MESA filing fee (fee information available at http://www.mass.gov/dfwele/dfw/nhesp/regulatory_review/mesa/mesa_fee_schedule.htm). Make check payable to "Commonwealth of Massachusetts - NHESP" and ***mail to NHESP*** at above address

Projects altering 10 or more acres of land, also submit:

(d) ☐ Vegetation cover type map of site

(e) ☐ Project plans showing Priority & Estimated Habitat boundaries

(f) OR Check One of the Following

1. ☐ Project is exempt from MESA review.
Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, http://www.mass.gov/dfwele/dfw/nhesp/regulatory_review/mesa/mesa_exemptions.htm; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59.)

2. ☐ Separate MESA review ongoing. a. NHESP Tracking # b. Date submitted to NHESP

3. ☐ Separate MESA review completed.
Include copy of NHESP "no Take" determination or valid Conservation & Management Permit with approved plan.

3. For coastal projects only, is any portion of the proposed project located below the mean high water line or in a fish run?

a. ☒ Not applicable – project is in inland resource area only b. ☐ Yes ☐ No

If yes, include proof of mailing, hand delivery, or electronic delivery of NOI to either:

South Shore - Cohasset to Rhode Island border, and the Cape & Islands:

Division of Marine Fisheries -
Southeast Marine Fisheries Station
Attn: Environmental Reviewer
836 South Rodney French Blvd.
New Bedford, MA 02744
Email: DMF.EnvReview-South@state.ma.us

North Shore - Hull to New Hampshire border:

Division of Marine Fisheries -
North Shore Office
Attn: Environmental Reviewer
30 Emerson Avenue
Gloucester, MA 01930
Email: DMF.EnvReview-North@state.ma.us

Also if yes, the project may require a Chapter 91 license. For coastal towns in the Northeast Region, please contact MassDEP's Boston Office. For coastal towns in the Southeast Region, please contact MassDEP's Southeast Regional Office.

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C. Other Applicable Standards and Requirements (cont'd)

Online Users: Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

4. Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?

   a. ☐ Yes ☒ No If yes, provide name of ACEC (see Instructions to WPA Form 3 or MassDEP Website for ACEC locations). **Note:** electronic filers click on Website.

   b. ACEC

5. Is any portion of the proposed project within an area designated as an Outstanding Resource Water (ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?

   a. ☐ Yes ☒ No

6. Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105)?

   a. ☐ Yes ☒ No

7. Is this project subject to provisions of the MassDEP Stormwater Management Standards?

   a. ☒ Yes. Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if:

      1. ☐ Applying for Low Impact Development (LID) site design credits (as described in Stormwater Management Handbook Vol. 2, Chapter 3)

      2. ☒ A portion of the site constitutes redevelopment

      3. ☐ Proprietary BMPs are included in the Stormwater Management System.

   b. ☐ No. Check why the project is exempt:

      1. ☐ Single-family house

      2. ☐ Emergency road repair

      3. ☐ Small Residential Subdivision (less than or equal to 4 single-family houses or less than equal to 4 units in multi-family housing project) with no discharge to Critical Areas.

      or

D. Additional Information

☐ This is a proposal for an Ecological Restoration Limited Project. Skip Section D and complete Appendix A: Ecological Restoration Notice of Intent – Minimum Required Documents (310 CMR 10.12).

Applicants must include the following with this Notice of Intent (NOI). See instructions for details.

Online Users: Attach the document transaction number (provided on your receipt page) for any of the following information you submit to the Department.

1. ☒ USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)

2. ☒ Plans identifying the location of proposed activities (including activities proposed to serve as a Bordering Vegetated Wetland [BVW] replication area or other mitigating measure) relative to the boundaries of each affected resource area.

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D. Additional Information (cont'd)

3. ☒ Identify the method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s), Determination of Applicability, Order of Resource Area Delineation, etc.), and attach documentation of the methodology.

4. ☒ List the titles and dates for all plans and other materials submitted with this NOI.

Beach Nourishment Plan Sheet
a. Plan Title

Comprehensive Environmental Inc.
b. Prepared By

c. Signed and Stamped by

August 2019
d. Final Revision Date

1:30
e. Scale

NOI Narrative; Lake Gardner Beach Nourishment Plan
f. Additional Plan or Document Title

August 2019
g. Date

5. ☐ If there is more than one property owner, please attach a list of these property owners not listed on this form.

6. ☒ Attach proof of mailing for Natural Heritage and Endangered Species Program, if needed.

7. ☐ Attach proof of mailing for Massachusetts Division of Marine Fisheries, if needed.

8. ☐ Attach NOI Wetland Fee Transmittal Form

9. ☒ Attach Stormwater Report, if needed.

E. Fees

1. ☒ Fee Exempt: No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority.

Applicants must submit the following information (in addition to pages 1 and 2 of the NOI Wetland Fee Transmittal Form) to confirm fee payment:

2. Municipal Check Number

3. Check date

4. State Check Number

5. Check date

6. Payor name on check: First Name

7. Payor name on check: Last Name

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F. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

1. Signature of Applicant

2. Date: 9/16/19

3. Signature of Property Owner (if different)

4. Date

5. Signature of Representative (if any): Stephanie Hanson

6. Date: 9-13-2019

For Conservation Commission:
Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

For MassDEP:
One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a **copy** of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

Other:
If the applicant has checked the "yes" box in any part of Section C, Item 3, above, refer to that section and the Instructions for additional submittal requirements.

The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.

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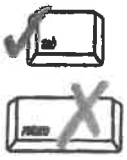
NOI Wetland Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

A. Applicant Information

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



1. Location of Project:

a. Street Address _____ b. City/Town _____

c. Check number _____ d. Fee amount _____

2. Applicant Mailing Address:

a. First Name _____ b. Last Name _____

c. Organization _____

d. Mailing Address _____

e. City/Town _____ f. State _____ g. Zip Code _____

h. Phone Number _____ i. Fax Number _____ j. Email Address _____

3. Property Owner (if different):

a. First Name _____ b. Last Name _____

c. Organization _____

d. Mailing Address _____

e. City/Town _____ f. State _____ g. Zip Code _____

h. Phone Number _____ i. Fax Number _____ j. Email Address _____

B. Fees

To calculate filing fees, refer to the category fee list and examples in the instructions for filling out WPA Form 3 (Notice of Intent).

Fee should be calculated using the following process & worksheet. ***Please see Instructions before filling out worksheet.***

Step 1/Type of Activity: Describe each type of activity that will occur in wetland resource area and buffer zone.

Step 2/Number of Activities: Identify the number of each type of activity.

Step 3/Individual Activity Fee: Identify each activity fee from the six project categories listed in the instructions.

Step 4/Subtotal Activity Fee: Multiply the number of activities (identified in Step 2) times the fee per category (identified in Step 3) to reach a subtotal fee amount. Note: If any of these activities are in a Riverfront Area in addition to another Resource Area or the Buffer Zone, the fee per activity should be multiplied by 1.5 and then added to the subtotal amount.

Step 5/Total Project Fee: Determine the total project fee by adding the subtotal amounts from Step 4.

Step 6/Fee Payments: To calculate the state share of the fee, divide the total fee in half and subtract $12.50. To calculate the city/town share of the fee, divide the total fee in half and add $12.50.

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B. Fees (continued)

Step 1/Type of Activity	Step 2/Number of Activities	Step 3/Individual Activity Fee	Step 4/Subtotal Activity Fee

Step 5/Total Project Fee:

Step 6/Fee Payments:

Total Project Fee:	a. Total Fee from Step 5
State share of filing Fee:	b. 1/2 Total Fee **less** $12.50
City/Town share of filling Fee:	c. 1/2 Total Fee **plus** $12.50

C. Submittal Requirements

a.) Complete pages 1 and 2 and send with a check or money order for the state share of the fee, payable to the Commonwealth of Massachusetts.

Department of Environmental Protection
Box 4062
Boston, MA 02211

b.) **To the Conservation Commission:** Send the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and the city/town fee payment.

To MassDEP Regional Office (see Instructions): Send a copy of the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and a **copy** of the state fee payment. (E-filers of Notices of Intent may submit these electronically.)

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Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.

A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

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[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

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Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

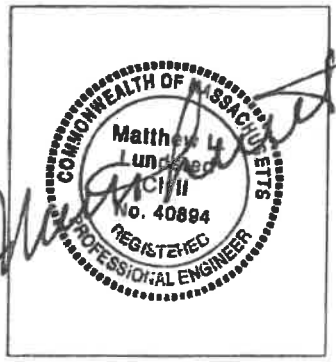
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



Signature and Date 9.13.2019

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☐ New development

☒ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- ☐ No disturbance to any Wetland Resource Areas
- ☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☐ Reduced Impervious Area (Redevelopment Only)
- ☐ Minimizing disturbance to existing trees and shrubs
- ☐ LID Site Design Credit Requested:
  - ☐ Credit 1
  - ☐ Credit 2
  - ☐ Credit 3
- ☐ Use of "country drainage" versus curb and gutter conveyance and pipe
- ☐ Bioretention Cells (includes Rain Gardens)
- ☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- ☐ Treebox Filter
- ☐ Water Quality Swale
- ☐ Grass Channel
- ☐ Green Roof
- ☒ Other (describe): N/A Beach Nourishment Project

Standard 1: No New Untreated Discharges

- ☒ No new untreated discharges
- ☐ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- ☐ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☐ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☐ Soil Analysis provided.

☐ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☐ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☐ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

☐ Site is comprised solely of C and D soils and/or bedrock at the land surface

☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000

☐ Solid Waste Landfill pursuant to 310 CMR 19.000

☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☐ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☐ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☐ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☐ The BMP is sized (and calculations provided) based on:

- ☐ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☐ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☒ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☒ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☐ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☒ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☐ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☐ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☐ Name of the stormwater management system owners;
- ☐ Party responsible for operation and maintenance;
- ☐ Schedule for implementation of routine and non-routine maintenance tasks;
- ☐ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☐ Description and delineation of public safety features;
- ☐ Estimated operation and maintenance budget; and
- ☐ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☐ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☐ An Illicit Discharge Compliance Statement is attached;

☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

1.0 Project Description

The proposed project includes annual beach nourishment maintenance activities located at the Lake Gardner Beach in Amesbury, Massachusetts.

1.1 Project Location & Property Owners

Annual beach nourishment maintenance activities will take place at:

Address:	79 High Street, Amesbury, MA 01913
Owner:	City Hall, Amesbury, MA 01913
Parcel Size:	5.02 Acres
Map/Lot#	39/2
Book & Page	5476/126

1.2 Project Background

Lake Gardner

Lake Gardener is a 93-acre lake located in the City of Amesbury. Fed by the Powow River from the north, Lake Gardner is impounded by an earthen dam located along its southern shoreline which was constructed in 1872. The Lake Gardner Watershed encompasses approximately 1,970-acres, located in the northern end of Amesbury and a small portion of South Hampton, NH. The dam has a granite core with a gravity spillway that discharges back to the Powow River through a 16-foot wide sluiceway controlled by three adjustable gates. The Lake Gardener Dam is used to control the flow of water out of the lake and to maintain sufficient storage volume while providing an area for recreational uses.

The Lake Gardner Beach is a public beach located at the south end of the lake. It is a popular recreational spot with parking for approximately 100 vehicles. Access is from an entrance on High Street or from Battis Farm (part of the Powow Conservation Area) located on South Hampton Road. Trails at the northern end of the beach area follow a narrow strip of land that links the beach to the trails of the Powow River Conservation Area. The lake is used for recreation such as swimming, motorized and non-motorized boating, fishing, wildlife viewing and habitat for aquatic life. Canoes, kayaks, small sail craft, and other car top boats can be launched from the northern end of the beach area.

Lake Gardner Beach Erosion

The Lake Gardener beach shoreline shape has remained largely unchanged over time. This is mainly due to the low erosion and sediment transport potential of the lake currents present, mixed with the minimal wave action on the lake. It also lacks any tidal forces that often impact coastal shorelines.

The major changes over time have been to the elevation profile of the beach. These are the results of anthropogenic use and natural erosional processes like surface runoff, groundwater upwelling and wind erosion. These elevation changes have been addressed, over the years, with the addition of clean sand to lowpoints when they appear.

The City of Amesbury Public Works (Public Works) has historically maintained the beach with assistance from the City of Amesbury Lakes and Waterways Commission and the Lake Gardner Improvement Association. In addition to general maintenance and cleanup of the beach and associated facilities, Public Works has maintained the dam and water level, historically drawing the water level down during the winter months with a yearly average of 2-feet between 2003 through 2017. Additionally, Public Works, with the City of Amesbury Conservation Commission's approval, generally deposits approximately 30 yds^3 of clean sand to the Lake Gardner Beach to replace sand lost due to surface erosion. This sand has been deposited above the water line with no change to the shape, elevation or extent of the shoreline.

The addition of clean sand to replace material washed away during heavy storms, has occurred on a yearly basis at the Lake Gardner Beach. Unlike most beach erosion that is the result of wave action, the slopes adjacent to the beach cause stormwater runoff to flow across the beach combined with groundwater upwelling at the base of the hill where the beach is located. The result is sand carried into Lake Gardner each spring when snowmelt occurs and the water table is high. Erosional channels are left behind and create a further conduit for runoff. Larger storms throughout the year also create a potential problem for this erodible area in addition to wind erosion and human activity impacts.

Public Works has taken measures to redirect surface runoff and groundwater to prevent beach erosion. A vegetated swale was constructed upgradient of the beach to collect runoff from the adjacent hill and convey it to a settling basin before discharging to Lake Gardner, reducing the severity of the erosion. Additionally, an engineered wall cut-off system (design funded through the MassDEP Nonpoint Source Grant Program) is planned for construction in the Fall of 2019 to help redirect groundwater upwelling at the surface to help reduce erosion.

1.3 Project Goal

The City of Amesbury's project goal is to carry out beach nourishment activities for the maintenance of the Lake Gardner Public Beach on an annual basis, as needed. The Lake Gardener Beach Nourishment Plan (attached), was developed for long-term guidance that includes the steps needed to monitor, maintain and if necessary, adapt beach nourishment strategies to help ensure sound environmental stewardship and meet the City's current and future goals.

Beach nourishment activities are aimed to:

- Plan for the short and long-term preservation of the beach for the public to comfortably utilize each summer;
- Provide a safe environment for children and adults using the beach;
- Maintain a high level of environmental stewardship and existing biodiversity for plants and wildlife and associated habitats in both terrestrial and aquatic ecosystems;
- Minimize erosion/sedimentation and improve water quality where feasible;

- Protect the interests (as applicable) set forth in the Massachusetts Wetlands Protection Act (M.G.L.c.131, §40), Massachusetts Wetlands Protection Act Regulations (310 CMR 10.00) and the City of Amesbury Wetlands Protection Ordinance (§460-1 through §460-14).

1.4 Description of Proposed Work

The proposed project includes the addition of approximately 30 cubic yards of clean sand annually as needed to the Lake Gardener Beach. Added material will be done in accordance with the 2019 Lake Gardener Beach Nourishment Plan (Plan) and such that added sand generally matches the mean diameter of the current beach sand (0.4mm) to the area where erosion is visible. Historically, these areas have included the vicinity of the boat launch; the erosion marks and small erosion channels cut in the sand from runoff; and near the path to the parking lot. Added sand should not dramatically change the beach profile and should be monitored as outlined in the Plan. This includes a seasonal monitoring plan to help determine what additional maintenance may be required and to evaluate the success of the previous years' beach nourishment maintenance activities.

Activities will include an inspection to determine if material is needed along with quantities and type/size followed by truck delivery and placement followed by activity conclusion with final documentation.

1.5 Resource Area Impacts

Since the goal of this project is to help maintain the Lake Gardner Beach, all activities will take place proximate to Lake Gardner and the following jurisdictional resource areas:

- Inland Beach
- Inland Bank Buffer Zone
- Riverfront Area
- Lake Buffer Zone (Amesbury Wetland Regulations)
- Bordering Land Subject to Flooding Buffer Zone (Amesbury Wetland Regulations)
- Land Under Water Buffer Zone (Amesbury Wetland Regulations)

Note that the Lake Gardener Beach is identified by the MA Natural Heritage and Endangered Species Program as estimated habitat for the state-listed eastern pondmussel *(Ligumia nasuta)*. A freshwater mussel survey in Lake Gardner was completed in 2019 (attached) to assess the potential effects of winter drawdown and *L. nasuta* was identified during this study. However, it was noted that annual beach nourishment likely did not have adverse effects on mussels and in fact, the small amounts of sand that reach nearshore areas near the beach probably improve sediment quality for mussels in these areas.

1.6 Protective Measures

Beach nourishment activities will take place during dry weather only to avoid erosion while the material is being placed.

1.7 Plan & Map Reference/Attachments

Cover Letter
Notice of Intent Application Form
Stormwater Checklist
Notice of Intent Narrative
Project Plan: Beach Nourishment
Lake Gardner Beach Nourishment Plan 2019 (includes site photographs and FIRM Map)
Site Locus Map
Assessor's Map
Certified Abutters List and Map and Lot # (Field Cards)
Copy of Letter of Notification to Abutters
Copy of Legal Notice
Proof of NHESP/MESA Filing
MassDEP Permit and Payment Transmittal Form

2.0 Activities Subject to Regulation

Since the goal of the project is to maintain the Lake Gardner Beach through annual (as-needed) beach nourishment, this project area is located near/in several resource areas/buffer zones. These areas include

- Inland Beach
- Inland Bank Buffer Zone
- Riverfront Area
- Lake Buffer Zone (Amesbury Wetland Regulations)
- Bordering Land Subject to Flooding Buffer Zone (Amesbury Wetland Regulations)
- Land Under Water Buffer Zone (Amesbury Wetland Regulations)

2.1 Compliance with Resource Area Performance Standards

Inland Beach (Amesbury Wetland Regulations 18.2)

Significance

Whenever a proposed project involves removing, filling, dredging, altering or building upon an inland bank or beach or within a minimum distance of 100 feet of an inland bank or beach, the Commission shall presume that the bank or beach is significant to the protection of the following wetland values: protection of public or private water supply; protection of groundwater; flood control; erosion and sedimentation control; storm damage prevention, including coastal storm flowage; prevention of water pollution; protection of fisheries, protection of wildlife and wildlife habitat; protection of rare species habitat, including rare plant and animal species; protection of recreation; and protection of aesthetics.

Performance Standards

1. *A proposed project shall not cause any adverse effect or cumulative adverse effect upon the wetland values of Inland Bank or Inland Beach.*

No adverse effects upon the wetland values of this resource area are expected.

2. *A proposed project shall be permitted only if there is no adverse effect on bank stability, bank height, ground water and surface water quality, the water carrying capacity of an existing channel within a bank, and the capacity of the bank to provide habitat for fisheries and/or wildlife.*

The proposed project is not expected to have any adverse effects on resource area functions.

3. *Notwithstanding the above provisions, no project may be permitted which will have any adverse effect on specified habitat of rare vertebrate or invertebrate and rare plant species, as identified by procedures established under 310 CMR 10.59.*

This proposed project is not expected to have any adverse effects on rare species or corresponding habitat.

Buffer Zones – (Amesbury Wetland Regulations 20.0)

Significance

The buffer zone is significant to the wetland values of the Resource Area which it borders. In addition, where rare species or vernal pools occur in the buffer zone, the buffer zone itself is significant for protection of rare species, rare species habitat, vernal pool organisms, and vernal pool habitat, respectively.

Performance Standards

1. *The intent of the Conservation Commission is to move all structures and activities as far away as possible from any Resource Area, in order to protect the wetland values of Resource Areas.*

This project requires annual inspection/monitoring so that the minimum amount of disturbance occurs an annual basis to achieve the project goals.

2. *Except as otherwise specified, Resource Area buffers shall be retained and maintained in a naturally vegetated condition. Where buffer disturbance has occurred during construction, revegetation with native vegetation may be required.*

No impacts to native vegetation are anticipated.

3. *The Commission may require that already-altered buffer zone be restored in order to protect or improve Resource Area values. Restoration means planting native vegetation, grading, correcting site drainage, removing debris, or other measures which will improve, restore and protect the wetland values of the Resource Area.*

Noted.

4. *Notwithstanding the above provisions, no project may be permitted which will have any adverse effect on specified habitat of rare vertebrate or invertebrate and rare plant species, as identified by procedures established pursuant to 310 CMR 10.59.*

The proposed project is not expected to have any adverse effects to habitat of rare vertebrate, invertebrate and/or rare plant species.

2.2 Compliance with Riverfront Area Performance Standards

The Lake Gardner Beach is located adjacent to the Lake Gardner Dam signifying the start of the Powow River. Therefore, proposed beach nourishment activities will take place within the Riverfront Area given its proximity to the dam. No adverse impacts are anticipated within the Riverfront Area however below is a summary of compliance with Riverfront Area Performance Standards and Alternatives Analysis.

Riverfront Area 310 CMR 10.58 Compliance

Significance
The Riverfront Area is likely to be significant to protect the private or public water supply, groundwater, provide flood control, prevent storm damage, prevent pollution, protect land containing shellfish, protect wildlife habitat and protect fisheries.

1. *The work shall meet the performance standards for all other resource areas within the riverfront area, as identified in 310 CMR 10.30 (Coastal Bank), 10.32 (Salt Marsh), 10.55 (Bordering Vegetated Wetland), and 10.57 (Land Subject to Flooding). When work in the riverfront area is also within the buffer zone to another resource area, the performance standards for the riverfront area shall contribute to the protection of the interests of M.G.L. c. 131, § 40 in lieu of any additional requirements that might otherwise be imposed on work in the buffer zone within the riverfront area.*

   The proposed project is not expected to compromise the interests identified above.

2. *No project may be permitted within the riverfront area which will have any adverse effect on specified habitat sites of rare wetland or upland, vertebrate or invertebrate species, as identified by the procedures established under 310 CMR 10.59 or 10.37, or which will have any adverse effect on vernal pool habitat certified prior to the filing of the Notice of Intent.*

   No vernal pools have been identified in the area. According to the Natural Heritage and Endangered Species Program (NHESP) online mapping system, the proposed project site is located in an area of Estimated Habitat of Rare Species or Priority Habitat of Rare Species. Thus, a streamlined MESA review has been requested concurrent with this NOI to ensure that no adverse effects occur to rare species. Proof of MESA mailing is provided with the application.

3. *There must be no practicable and substantially equivalent economic alternative to the proposed project with less adverse effects on the interests identified in M.G.L. c. 131 § 40.*

   There is no practicable and substantially equivalent economic alternative to the proposed project with less adverse effects on the above resource areas that will also meet the goals of this project. See Alternatives Analysis below.

Alternatives Analysis

There are two project alternatives that were considered when determining the most effective action and least amount of impact for the Lake Gardner Beach Nourishment Project.

1. No Action Alternative – The goal of this project is to provide a safe and accessible recreational space for residents to enjoy Lake Gardner. With the majority of the shoreline inaccessible, the Lake Gardner Beach provides an area for residents to safely access and enjoy Lake Gardner while minimizing shoreline impacts. This No Action alternative would not meet the goals of the proposed project with the potential to severely limit the future recreation activities at this location.

2. Alternative #1 (Preferred Alternative) – The City of Amesbury developed the Lake Gardner Beach Nourishment Plan in 2019 based on the Massachusetts Department of Environmental Protection's (MassDEP) *Guide to Best Management Practices for Projects in Massachusetts,* March 2007. Alternative #1 includes the addition of approximately 30 yds^3 of clean sand to the Lake Gardner Beach based on annual beach inspections and recommended maintenance activities. This alternative would help achieve the stated project goals. Alternative #1 is not anticipated to result in negative resource area impacts.

In conclusion, Alternative #1 would achieve the project goals in the most cost-effective manner for the residents of Amesbury.

3.0 Stormwater Standards Report

Standard 1. No New Untreated Discharges

No new stormwater discharges are expected.

Standard 2. Peak Rate Attenuation

N/A

Standard 3. Recharge

N/A

Standard 4. Water Quality

N/A No impact to water quality is anticipated since no new discharges or impervious area are proposed.

Standard 5. Land Uses With Higher Potential Pollutant Loads

N/A The project is not in an area with higher potential pollutant loads.

Standard 6. Critical Areas

N/A Lake Gardner is not an Outstanding Resource Water or Special Resource Water and no new discharges are planned.

Standards 7. Redevelopments and Other Projects Subject to the Standards Only to the Maximum Extent Practicable

No new discharges or impervious area are planned.

Standard 8. Construction Period Pollution Prevention and Erosion and Sedimentation Control

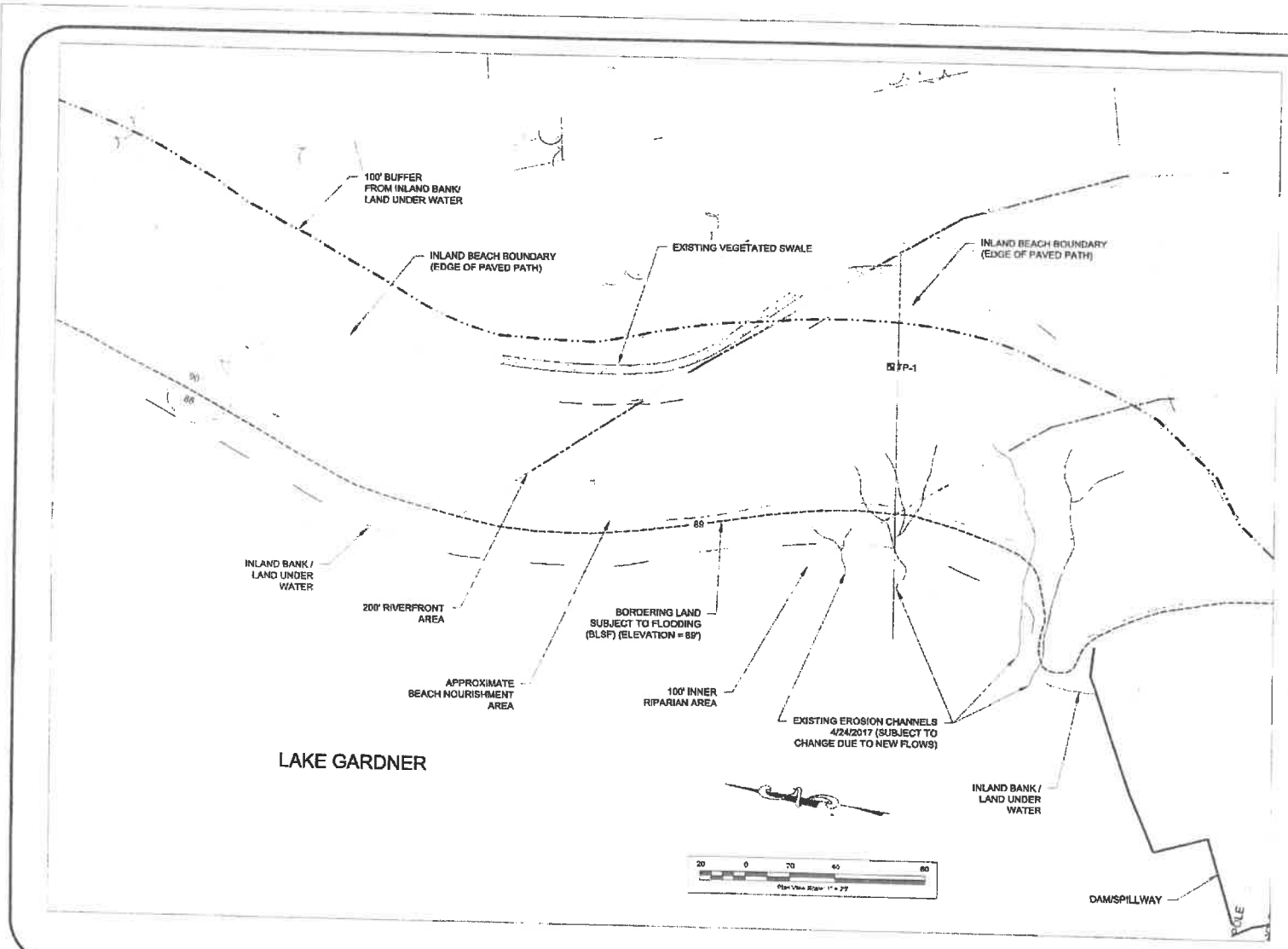
Project includes <1 acre of disturbance therefore not covered under the Construction General Permit. Protective measures are discussed in Section 1.6 of the NOI Narrative.

Standard 9. Operations & Maintenance Plan

N/A Inspection and monitoring report templates and included in the attached 2019 *Lake Gardner Beach Nourishment Plan.*

Standard 10. Prohibition of Illicit Discharges

N/A There are no illicit discharges proposed. If identified during beach nourishment activities, the City of Amesbury will investigate the source and work to eliminate all illicit connections.



General Notes

1. THE BASE FLOOD ELEVATION (BFE) OF 89' WAS OBTAINED FROM THE FLOOD INSURANCE RATE MAP (FIRM), MAP NUMBER 25027C0102F. THE FLOOD ZONE IDENTIFIED ON THE FIRM MAP CORRESPONDS TO THE 100-YEAR FLOODPLAIN (ZONE AE).

No.	Revision/Issue	Date

COMPREHENSIVE ENVIRONMENTAL INCORPORATED
41 MAIN STREET
BOLTON, MA 01740

BEACH NOURISHMENT

CITY OF AMESBURY
62 FRIEND STREET
AMESBURY, MA 01913

Project NO. 175-22	Sheet: C-1
Date: AUG 2019	
Designed by: CLB	
Checked by: MLL	
Scale: As Shown	

2019

Lake Gardner Beach Nourishment Plan

Amesbury, Massachusetts
August 2019

Completed for:

City of Amesbury, Massachusetts
Department of Public Works
39 South Hunt Road
Amesbury, Massachusetts 01913

Completed by:

Comprehensive Environmental Inc.
41 Main Street
Bolton, Massachusetts 01740

Table of Contents

Figures

Appendices

1.0 Project Purpose & Goals

The purpose of the Lake Gardner Beach Nourishment Plan is to provide an overview of the historic management practices of Lake Gardner; outline current conditions, needs, and practices; and outline recommended beach nourishment activities for the maintenance of the Lake Gardner Public Beach. Developing a long-term plan that includes the steps needed to monitor, maintain and if necessary, adapt beach nourishment strategies can help ensure sound environmental stewardship and meet the City's current and future goals.

Beach nourishment activities outlined in this plan are aimed to:

- Plan for the short and long-term preservation of the beach for the public to comfortably utilize each summer;
- Provide a safe environment for children and adults using the beach;
- Maintain a high level of environmental stewardship and existing biodiversity for plants and wildlife and associated habitats in both terrestrial and aquatic ecosystems;
- Minimize erosion/sedimentation and improve water quality where feasible;
- Protect the interests (as applicable) set forth in the Massachusetts Wetlands Protection Act (M.G.L.c.131, §40), Massachusetts Wetlands Protection Act Regulations (310 CMR 10.00) and the City of Amesbury Wetlands Protection Ordinance (§460-1 through §460-14).

This document is based on the Massachusetts Department of Environmental Protection's (MassDEP) *Guide to Best Management Practices for Projects in Massachusetts, March 2007.* Although the above referenced MassDEP's guidance document was intended for coastal environments, many of the principals remain valid for inland, freshwater locations like the Lake Gardner Beach where beach nourishment is considered. Specific guidance manual adjustments are noted where applicable in this plan.

2.0 Background

Lake Gardener is a 93-acre lake located in the City of Amesbury (Figure 1). Fed by the Powow River from the north, Lake Gardner is impounded by an earthen dam located along its southern shoreline which was constructed in 1872. The Lake Gardner Watershed encompasses approximately 1,970-acres, located in the northern end of Amesbury and a small portion of South Hampton, NH. The dam has a granite core with a gravity spillway that discharges back to the Powow River through a 16-foot wide sluiceway controlled by three adjustable gates. In addition to the overflow spillway and sluiceway, a low-level outlet with a 24-inch valve is located on the left side of the sluiceway. The structure was privately owned and operated until 1964 when the City of Amesbury obtained ownership of the dam.

The Lake Gardener Dam is used to control the flow of water out of the lake and to maintain sufficient storage volume while providing an area for recreational uses. Field measurements indicate the spillway maintains an average water depth of 6 to 7 feet in the lake. Dams at Tuxbury Pond, Lake Attitash and Meadowbrook Pond are used by the City to control the flow of water into the Powow River where the City obtains its drinking water.

The Lake Gardner Beach is a public beach located at the south end of the lake. It is a popular recreational spot with parking for approximately 100 vehicles. Access is from an entrance on High Street or from Battis Farm (part of the Powow Conservation Area) located on South Hampton Road. Trails at the northern end of the beach area follow a narrow strip of land that links the beach to the trails of the Powow River Conservation Area (Figure 2). The lake is used for recreation such as swimming, motorized and non-motorized boating, fishing, wildlife viewing and habitat for aquatic life. Canoes, kayaks, small sail craft, and other car top boats can be launched from the northern end of the beach area.

The reach of the Powow River where Lake Gardner is located is listed as Category 5 impaired water body on the finalized *2014 303(d) List of Impaired Waters* for fecal coliform, total suspended solids (TSS) and turbidity (inlet segment) and *E. coli* for outlet segment. A Category 5 impaired water body is defined as a

waterbody which is impaired or threatened for one or more uses and requiring the development of a TMDL. The Lake Gardner drainage area is included in the Draft Pathogen TMDL for the Merrimack River Watershed, which reports the sources of bacteria in the watershed vary and are difficult to provide accurate quantitative estimates because bacteria sources are often intermittent and difficult to monitor. However, the TMDL indicates most sources are believed to be stormwater related.

3.0 Existing Site Features

Lake Gardner Beach, located at 79 High Street in Amesbury, Massachusetts is a well-maintained combination of beach, park and boat launch. Totaling near 32,000 ft^2 of sand and grass, the park is a high traffic area for beachgoers and boaters.

Land Use
The majority of land use within the Lake Gardner watershed is forest or cropland. Residential areas are scattered with the highest concentration found along the western shore of Lake Gardner. Residential properties are primarily medium to low density lots with a small percentage of high density and multi-family complexes near the lake. Land uses such as open space, recreation, commercial and mining make up the remaining portion of the land found within the watershed. The Lake Gardener Beach is surrounded by primarily residential lots and conservation land (Figure 3).

Soils
The Lake Gardner watershed soil survey splits the watershed into four areas with distinct porosity characteristics. Sandy loam soils found on the east side of the lake have moderate infiltration rates while soils on the west side of the lake tend to have slow infiltrating soils. These slow infiltrating soils follow the ridgeline along Whitehall Road. A small pocket of moderate infiltrating soils is located in the area of Unicorn Circle. Very slow infiltration rates are characteristic of soils located along the Powow River corridor where silty loam predominates the area. These soils are also found in the large wetland areas near Lions Mouth Road. A large area located on the western boundary of the watershed has the highest infiltration rates with soils made up of a sand and gravel complex (Figure 4).

The soils located at the Lake Gardner Beach per the USGS soil survey show a map unit of Ud-Udorthents, smooth. According to the USGS, this map unit is characterized as consisting of nearly level and gently sloping areas where the original soils have been cut away or covered with a loamy fill material. Most areas have been graded to a smooth surface. Areas are dominantly on uplands but are in almost every landscape position. Slopes are smooth or irregular, and range from 0 to 25 percent but are dominantly 0 to 5 percent. Where the original soil has been cut away, Udorthents, loamy, typically consist of the exposed substrata of Boxford, Charlton, Newport, Paxton, Pittstown, or Woodridge soils. In areas that have been filled consist of several soils or of one soil removed from an adjacent cut. Areas have a loamy texture with dominantly fine sandy loam. Included with this map unit are areas of Udorthents, sandy, near abandoned gravel pits and Udorthents, wet substratum, on wetlands. Also included are small areas of Urban land.

In 2017 a test pit was conducted by the City of Amesbury Department of Public Works at the Lake Gardner beach. A clay layer was encountered at a depth of approximately 42" with a 10" thickness. During the test pit, groundwater was observed breaking out of the test pit wall at the top of the clay lens. This reinforces the previous supposition that groundwater is contributing to the beach erosion. The approximate surface elevation of the test pit was elevation 97'. The downslope erosion concentrates and begins around surface elevation 93' (Figure 5).

Wetland Resource Areas
According to the National Wetland Inventory (NWI) map for the area, the only classified wetlands near the beach is the lake itself (L1UBHh – lacustrine, limnetic, unconsolidated bottom, permanently flooded, diked/impounded) and a wetland area adjacent to the outlet (PFO1E – palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated) (Figure 6).

FEMA
The Lake Gardner Beach is in zone AE according to the FIRM (Flood Insurance Rate Map). The FEMA flood elevation is at elevation 89' as the 100-year base flood elevation (BFE) (Figure 7).

4.0 Freshwater Mussel Survey

The Massachusetts Natural Heritage and Endangered Species Program (NHESP) has documented the state-listed Eastern Pondmussel (*Ligumia nasuta*) in Lake Gardner. As a result, a freshwater mussel survey was conducted in June 2019 with NHESP scope approval. The study included a combination of qualitative and quantitative sampling to compare mussel population and habitat parameters in shallow (<2.5 ft) and nearby deeper (4-7 ft) areas of Lake Gardner, to help provide guidance on the effects of a 2-ft water drawdown and beach nourishment on mussel populations and habitat.

The study was requested by the NHESP who issued the Commercial Scientific Collection Permit prior to the start of fieldwork. Surveys were conducted over a 3-day period, from July 7-9, 2019. Four species were found during both the qualitative and quantitative sampling, including *Elliptio complanata* (eastern elliptio), *Lampsilis radiata* (eastern lampmussel), *Ligumia nasuta* (eastern pondmussel), and *Pyganodon cataracta* (eastern floater). *E. complanata* comprised approximately 96% of the mussel community. During both types of sampling, only 24 *L. radiata*, 14 *L. nasuta*, and 9 *P. cataracta* were found. Generally, plots in lower Gardner Lake contained more species and higher mussel densities than plots in the lake's narrower northern half. Shallow plots contained more species and higher mussel densities than adjacent deep plots.

Amesbury is not proposing to alter its current schedule for seasonal drawdowns of Lake Gardner, or to achieve deeper seasonal drawdowns. The survey concluded that it seems these drawdowns can continue as they have for the last 12 years, with little effect on the lake's mussel community. Conclusions recommend trying to keep the pool elevation during the drawdown period within 1.5 ft of normal pool elevation. If it is necessary to drop the lake levels to 2 or more feet below normal pool elevation, monitoring mussels in nearshore areas is recommended.

Report conclusions also indicate that beach surface runoff in the area of the historic and proposed beach nourishment likely transports some of this sand into nearshore areas over time without suspected adverse effects on mussels. It was noted that small amounts of sand that reach nearshore areas at the beach probably improve sediment quality for mussels in these areas.

The final survey report is included in Appendix A.

5.0 Sediment Analysis and Beach Profile

MassDEPs Beach Nourishment guidance stresses the most important factor for a beach nourishment project is the grain size distribution of the source material as compared to the native beach material, also referred to as 'sediment compatibility'.

To determine the sediment characteristics of the Lake Gardner Beach, CEI conducted a sediment sampling and analysis program to generate a composite profile of the beach. The outcome of this program is a detailed classification of the current beach sediment that can be compared to possible fill sources to ensure an acceptable match is found. The method used was adapted, for scale, from MassDEP's Beach Nourishment guidance.

Existing Sediment Characteristics
To assess compatibility of possible fill sediment with the current beach environment, CEI collected a series of grab samples from three different locations along the beach (Figure 8). Grain size relates to erosion and the longevity of the beach, in addition to cost of fill. Ideally, the grain size of the fill material will match the native beach material as closely as possible, or be slightly larger to minimize erosion.

Smaller sediment often requires more material to reach equilibrium, and may only be stable on slopes less than the current beach profile.

CEI collected samples in the first foot of sediment, at random in a three-foot area around each location to represent a composite sample. The distinction for the samples is based on the environmental breaks found in the MassDEP's *Beach Nourishment Guide* but is adapted to Lake Gardner where nearshore, mid shore, and upper shore were used based on proximity to the water.

Collected samples were analyzed for grain size analysis following ASTM D6913 guidelines. All samples were submitted to GeoTesting Express, an accredited laboratory located in Acton, Massachusetts for analysis. Resulting data indicate that the areas sampled are relatively homogeneous sand with particle sizes ranging from .075mm to 9mm with a mean grain size of approximately 0.4mm. The sand is poorly sorted and angular, with a dark yellowish-brown color (Figure 9). The mineral composition is heavily quartz dominated, and is common for the area. This composition speaks highly to the grain's resistance to abrasion. The laboratory report is included in Appendix B.

Based on these results, the mean grain size to obtain for nourishment material should be greater than or equal to approximately 0.4mm, which is the mean grain size for the Lake Gardner beach. This is a medium to course grained sand with a size comparable to that of table salt, for reference.

Beach Profile
The Lake Gardener beach shoreline shape has remained largely unchanged over time. This is mainly due to the low erosion and sediment transport potential of the lake currents present, mixed with the minimal wave action on the lake. It also lacks any tidal forces that often impact coastal shorelines. The slightly clockwise current is likely reminiscent of the meandering Powow River prior to dam construction. Though this may have been a major process when it was a river, the dam now acts as a dampening agent, causing a drop-in competency and deposition of sediment.

The major changes over time have been to the elevation profile of the beach. These are the results of anthropogenic use and natural erosional processes like surface runoff, groundwater upwelling and wind erosion. These elevation changes have been addressed, over the years, with the addition of clean sand to lowpoints when they appear. Figure 10 shows the current approximate beach profile.

6.0 Previous Beach Management Activities

The City of Amesbury Department of Public Works (DPW) has historically maintained the beach with assistance from the City of Amesbury Lakes and Waterways Commission and the Lake Gardner Improvement Association. In addition to general maintenance and cleanup of the beach and associated facilities, the DPW has maintained the dam and water level, historically drawing the water level down during the winter months with a yearly average of 2-feet between 2003 through 2017. Additionally, the DPW, with the City of Amesbury Conservation Commission's approval, generally deposits approximately 30 yds^3 of clean sand to the Lake Gardner Beach to replace sand lost due to surface erosion. This sand has been deposited above the water line with no change to the shape, elevation or extent of the shoreline.

An existing *Lake Gardner Beach Management Plan* dated January 10, 2017 developed by the City of Amesbury Lakes and Waterways Commission was completed for the purposes of establishing policies for the operations, maintenance and preservation of Lake Gardner Beach including facilities, recreation and resource areas. Sections include erosion control and management where the installation of swales, drains, retaining walls, and landscape changes are listed as possible Best Management Practices (BMPs) to consider and on beach maintenance that includes seasonal sand raking and the addition of new sand to the beach once per season.

7.0 Beach Nourishment

Definition
Per the MassDEP Beach Nourishment Guidance, Beach nourishment is defined as the process of adding sediment to a beach system. Two types of beach nourishment are recognized in Massachusetts. These include:

1. The beneficial reuse of clean compatible sediment from a nearby dredging project to augment the volume of beach by placing material directly on the beach or nearshore where it can act as a source of sediment, the goal of this type is to keep the dredged sediment in the littoral zone; or
2. a designed and engineered project where a specific volume of sand is added to a beach to provide a desired level of storm damage protection and flood control and ultimately creating a more usable beach.

MassDEPs guidance stresses that the most important factor for a beach nourishment project is the grain size distribution of the source material as compared to the native beach material, also referred to as sediment compatibility.

Erosion
The addition of clean sand to replace material washed away during heavy storms, has occurred on a yearly basis at the Lake Gardner Beach. Unlike most beach erosion that is the result of wave action, the slopes adjacent to the beach cause stormwater runoff to flow across the beach combined with groundwater upwelling at the base of the hill where the beach is located. The result is sand carried into Lake Gardner each spring when snowmelt occurs and the water table is high. Erosional channels are left behind and create a further conduit for runoff. Larger storms throughout the year also create a potential problem for this erodible area in addition to wind erosion and human activity impacts (Figure 11).

The Amesbury DPW has taken measures to redirect surface runoff and groundwater to prevent beach erosion. A vegetated swale was constructed upgradient of the beach to collect runoff from the adjacent hill and convey it to a settling basin before discharging to Lake Gardner, reducing the severity of the erosion. Additionally, an engineered wall cut-off system (design funded through the MassDEP Nonpoint Source Grant Program) is planned for construction in the Fall of 2019 to help redirect groundwater upwelling at the surface to help reduce erosion.

Recommendations
The continued annual addition of approximately 30 yds^3 of clean sand that matches the mean diameter of the beach sand as close as possible (0.4mm) to the beach where erosion is visible. Historically, these areas included the vicinity of the boat launch; the erosion marks and small erosion channels cut in the sand from runoff; and near the path to the parking lot. Added sand should not dramatically change the beach profile and should be monitored as outlined in Section 8.0.

8.0 Monitoring & Recordkeeping

A seasonal monitoring plan is recommended to help determine what additional maintenance may be required and to evaluate the success of the previous years' beach nourishment activities. After beach nourishment takes place in the spring the following steps should be taken:

- generate beach profile with new material annually after beach nourishment;
- summer/fall seasonal inspections and after each 100-year storm and after a major weather event (hurricane winds), inspection reports should include:
    - noted changes including those to the overall profile, composition, or elevation;
    - suspected source of change (grain size too small, upland BMP requires maintenance etc....);
    - recommendation as to whether immediate action should be taken to address a safety or significant environmental issue;
    - recommendation to proceed with the current plan or if plan modifications are needed.

In the event of major erosion or profile changes, a reevaluation of the plan may need to be considered. Small adjustments may be made as needed, as long as they follow the plan guidelines and fit the grain profile.

Appendix C contains activity and inspection report templates. All reports will be presented at the next regularly scheduled Lakes and Waterways Committee meeting, entered into the minutes and kept on file for a minimum of 5-years. Copies will also be kept on record with the DPW. Current site photographs for future comparison are included in Appendix D.

Figures

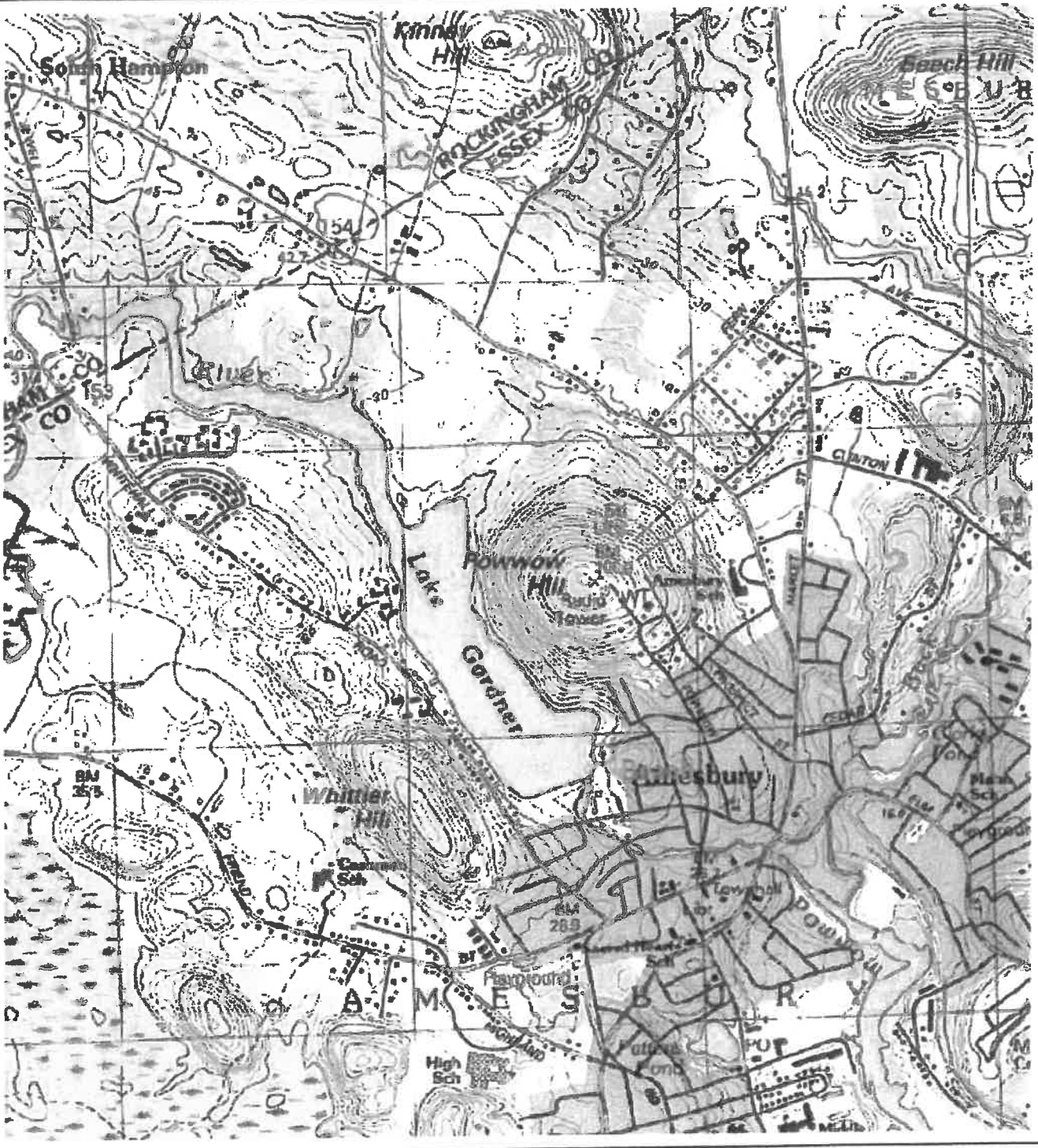


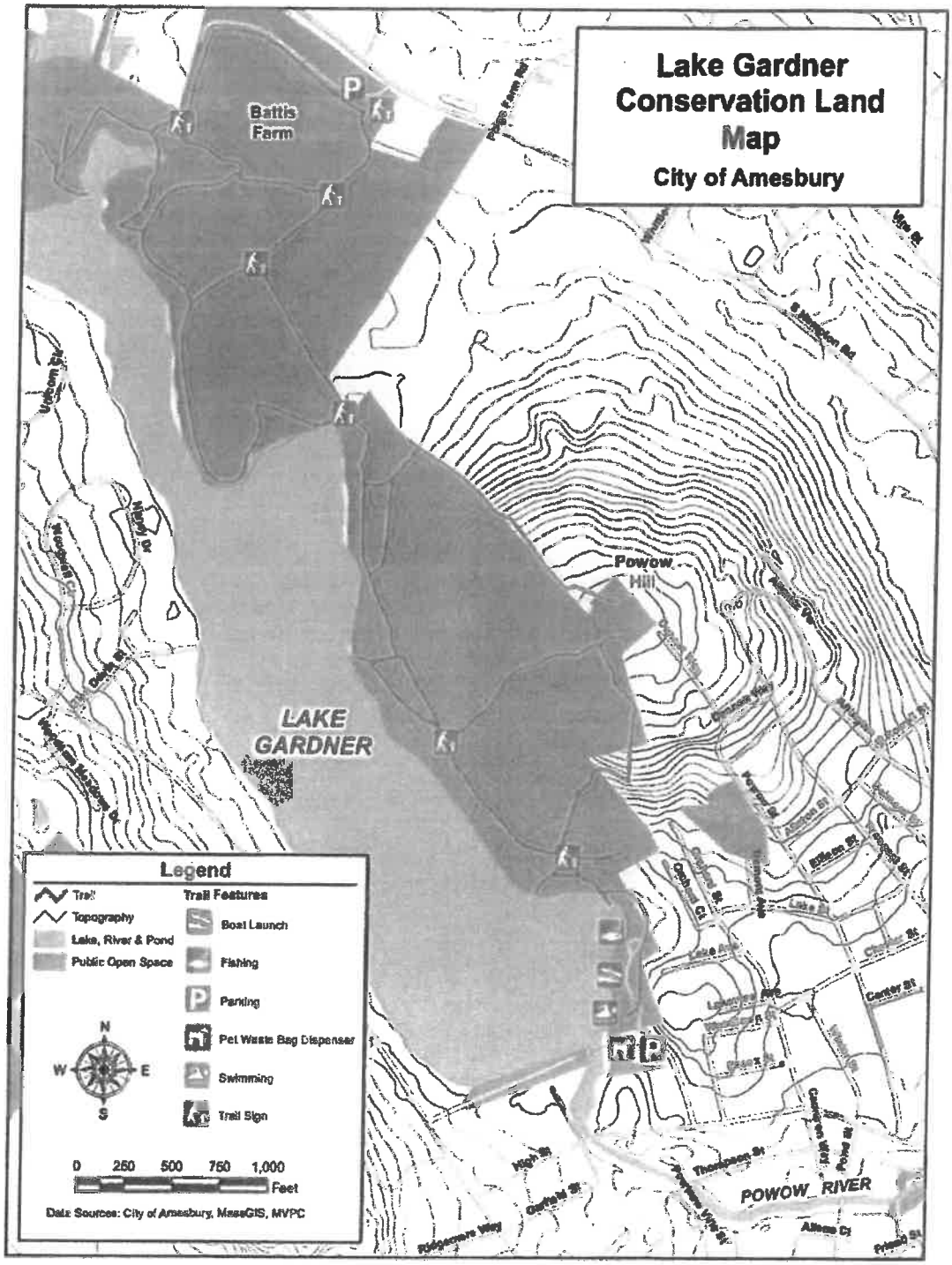
Figure 1. Site Locus

Lake Gardner Beach

City of Amesbury, MA

Lake Gardner Beach Nourishment Plan

COMPREHENSIVE ENVIRONMENTAL INCORPORATED



COMPREHENSIVE ENVIRONMENTAL INCORPORATED

Figure 2.

Lake Gardner Conservation Land

City of Amesbury, MA

Lake Gardner Beach Nourishment Plan

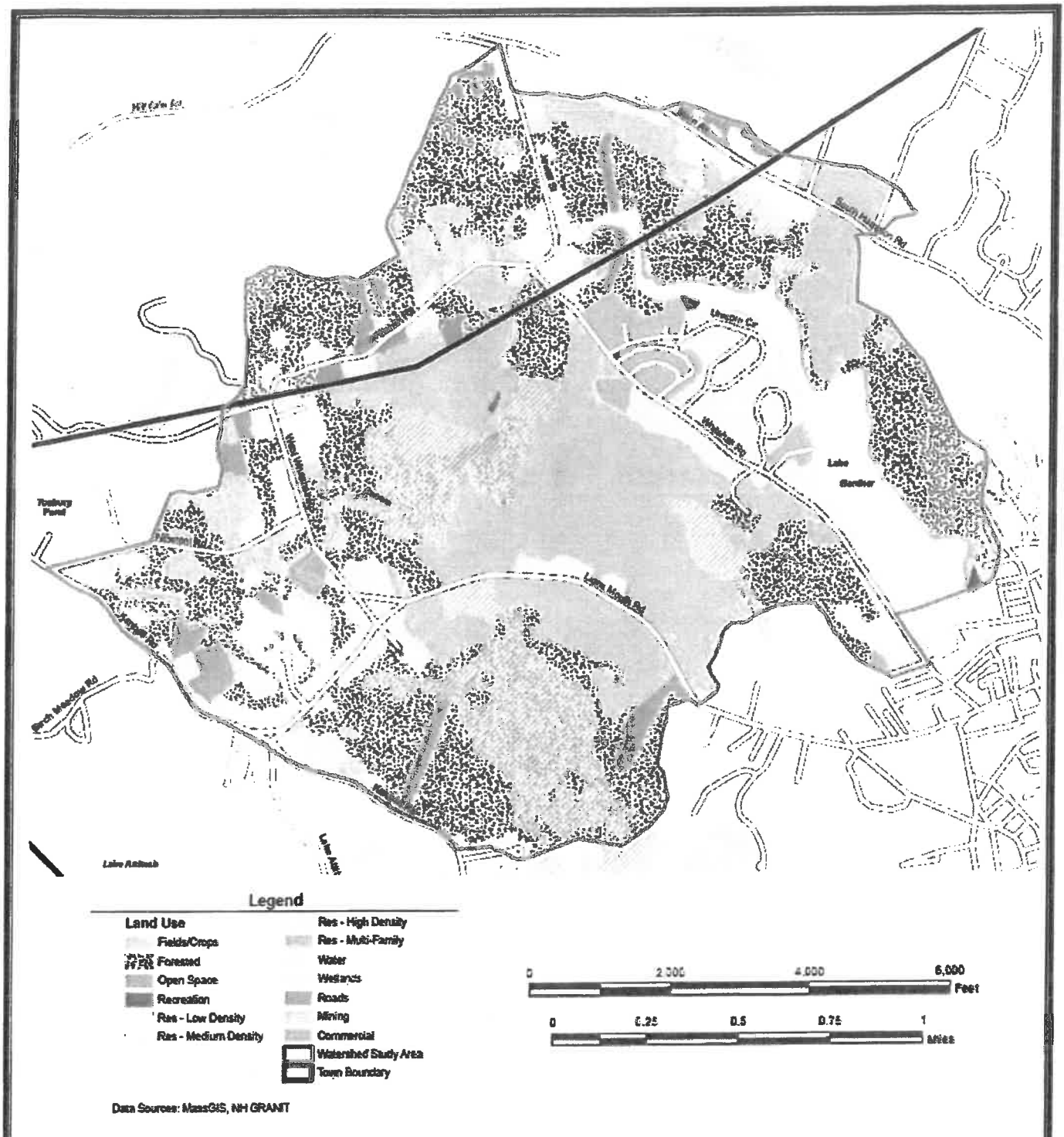


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Figure 3. Lake Gardner Watershed Land Use Characteristics

Lake Gardner Beach

City of Amesbury, MA

Lake Gardner Beach Nourishment Plan

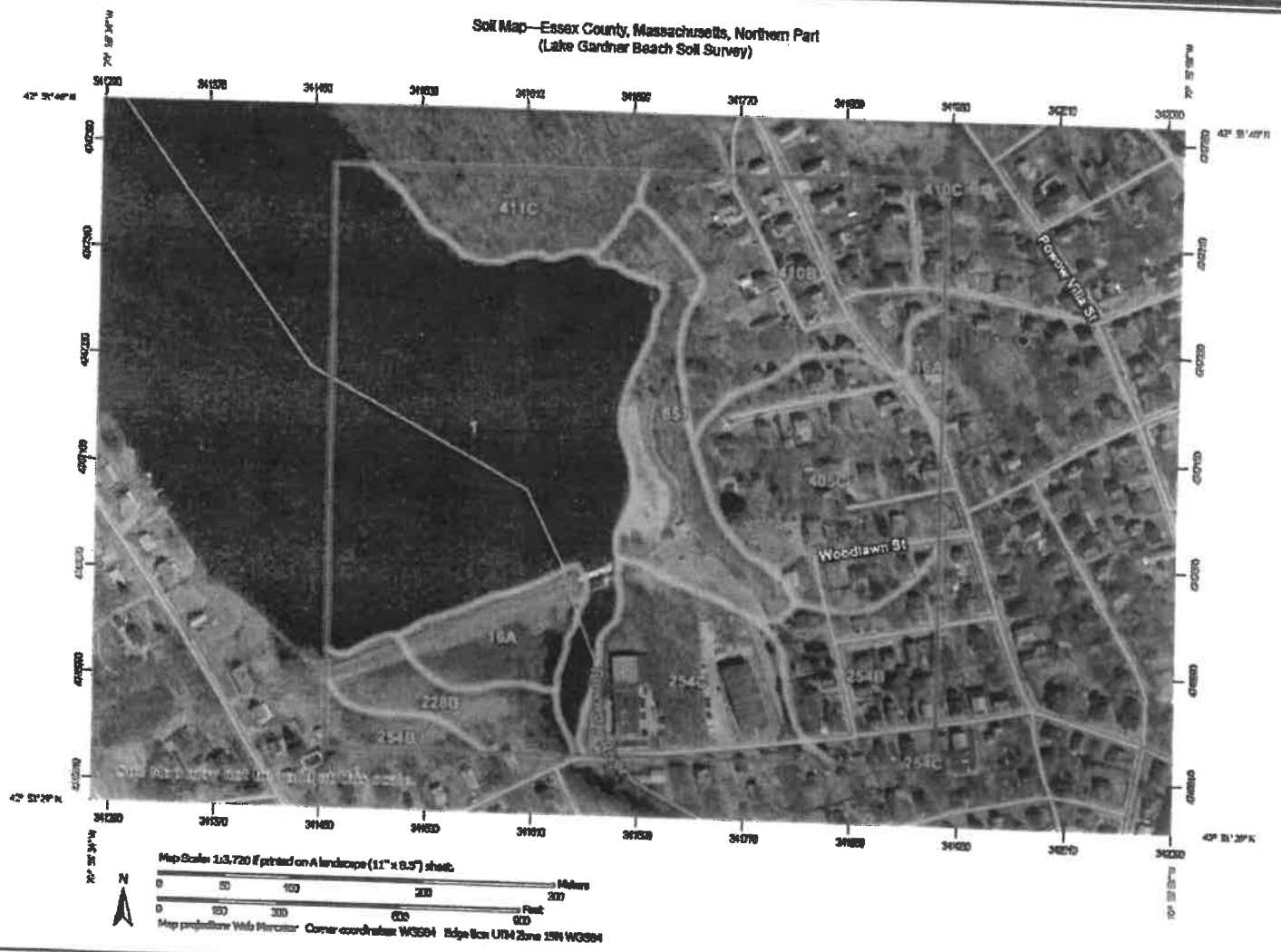

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Figure 4. NRCS Soil Classification

Lake Gardner Beach

City of Amesbury, MA

Lake Gardner Beach Nourishment Plan

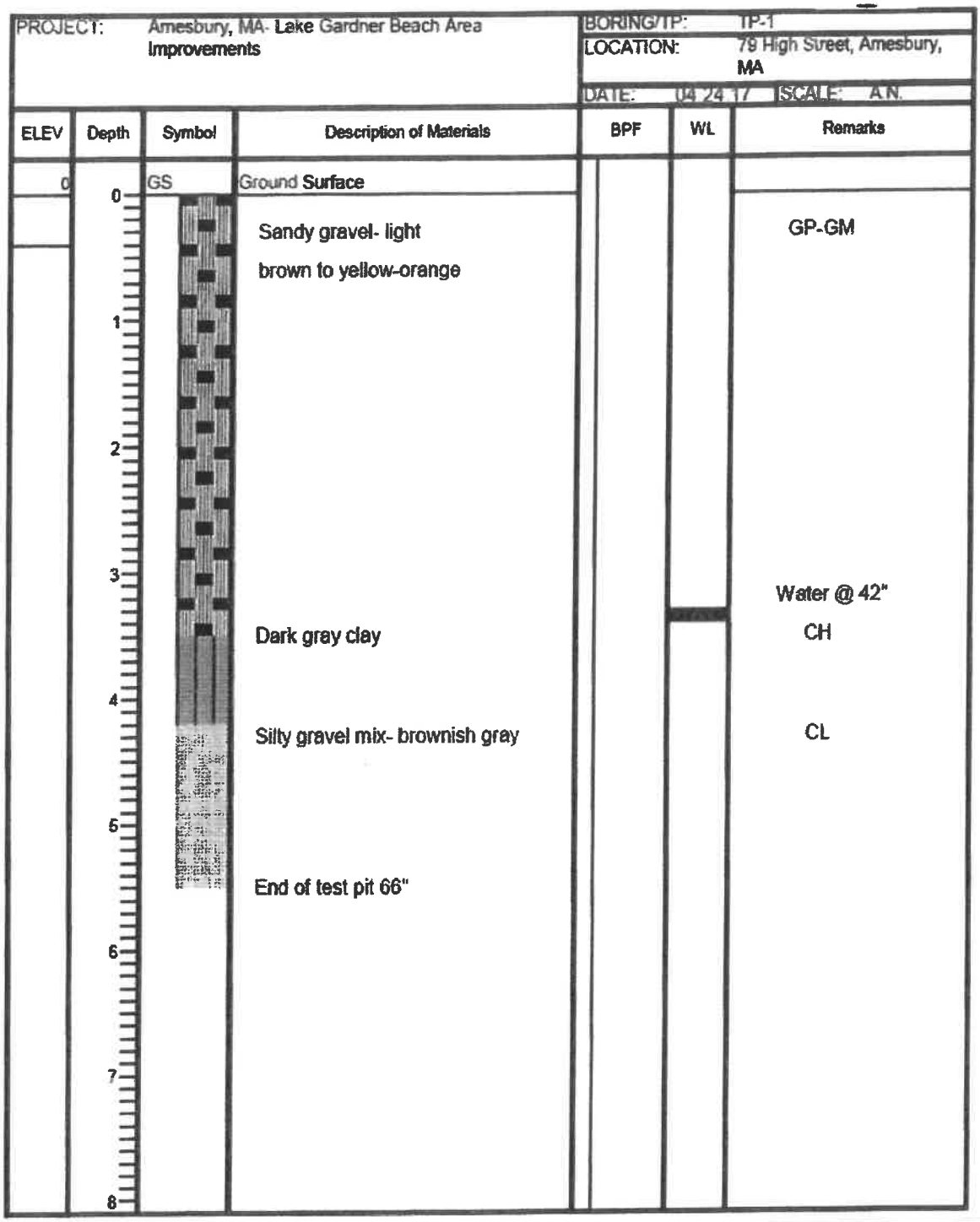

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Figure 5. Beach Test Pit Log

Lake Gardner Beach

City of Amesbury, MA

Lake Gardner Beach Nourishment Plan

COMPREHENSIVE ENVIRONMENTAL INCORPORATED

Figure 6. National Wetlands Inventory

Lake Gardner Beach

City of Amesbury, MA

Lake Gardner Beach Nourishment Plan

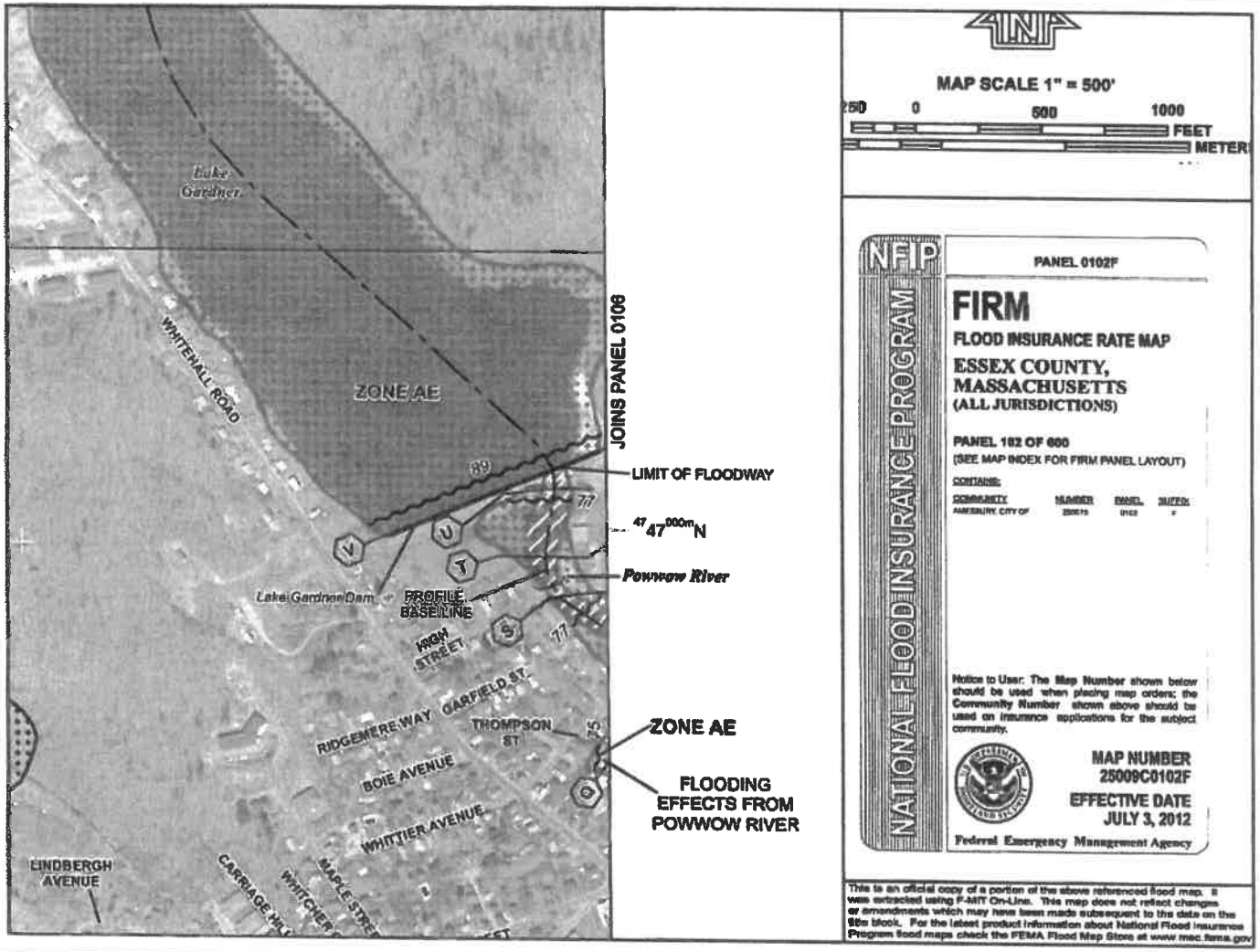

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Figure 7. FEMA Map

Lake Gardner Beach

City of Amesbury, MA

Lake Gardner Beach Nourishment Plan

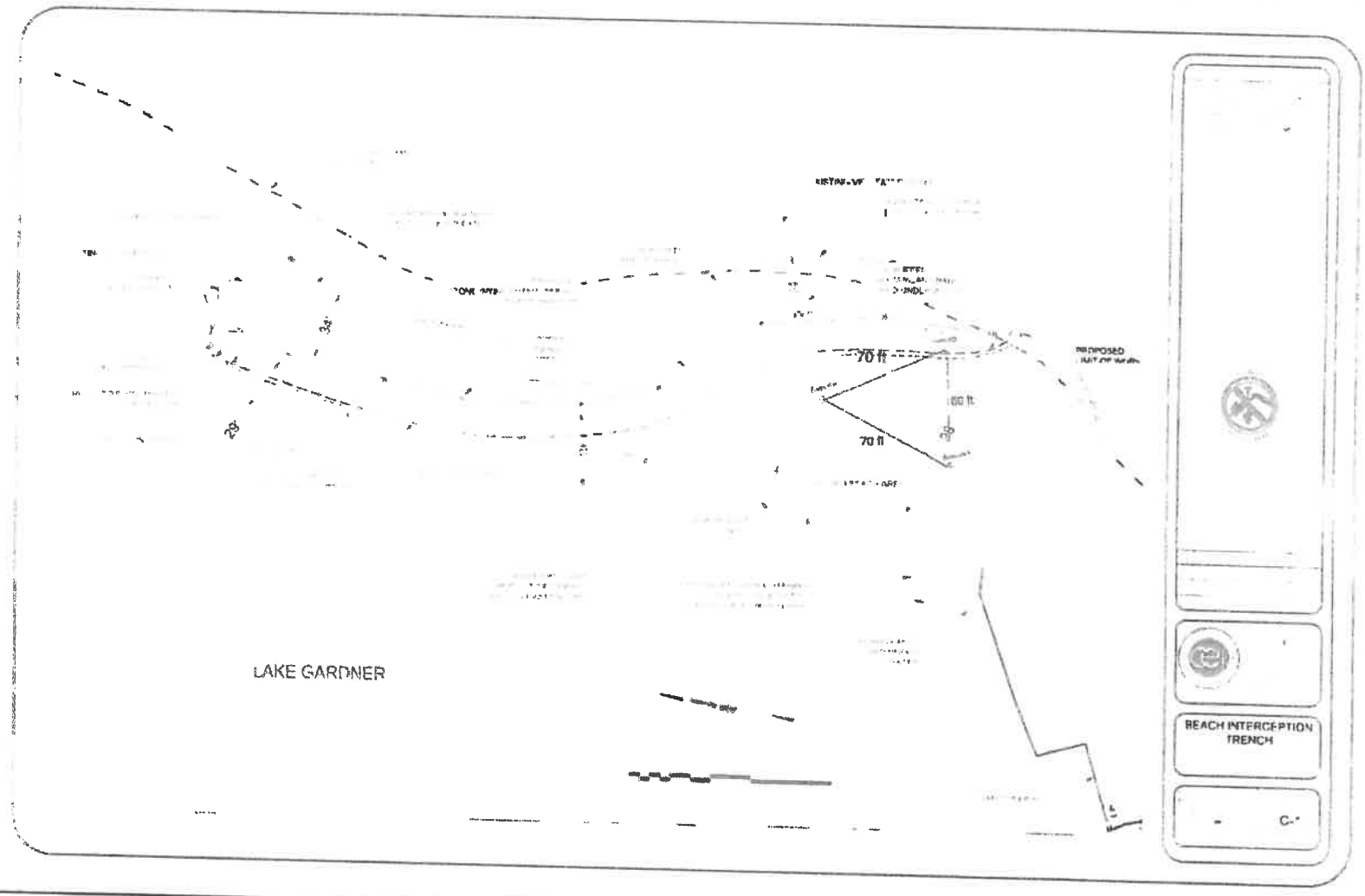

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Figure 8. Sample Locations

Lake Gardner Beach

City of Amesbury, MA

Lake Gardner Beach Nourishment Plan

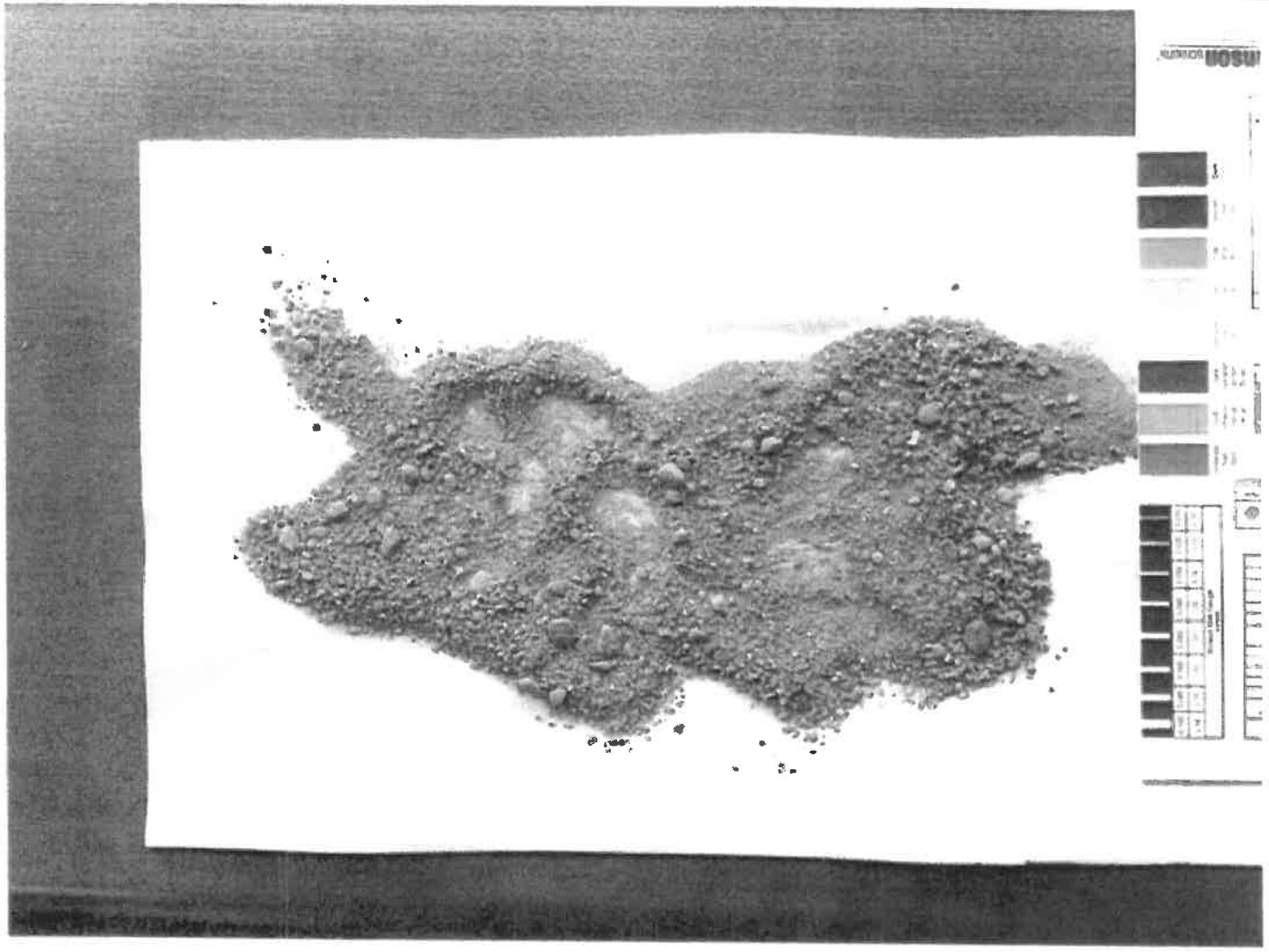

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Figure 9. Sediment Sample Photograph

Lake Gardner Beach

City of Amesbury, MA

Lake Gardner Beach Nourishment Plan

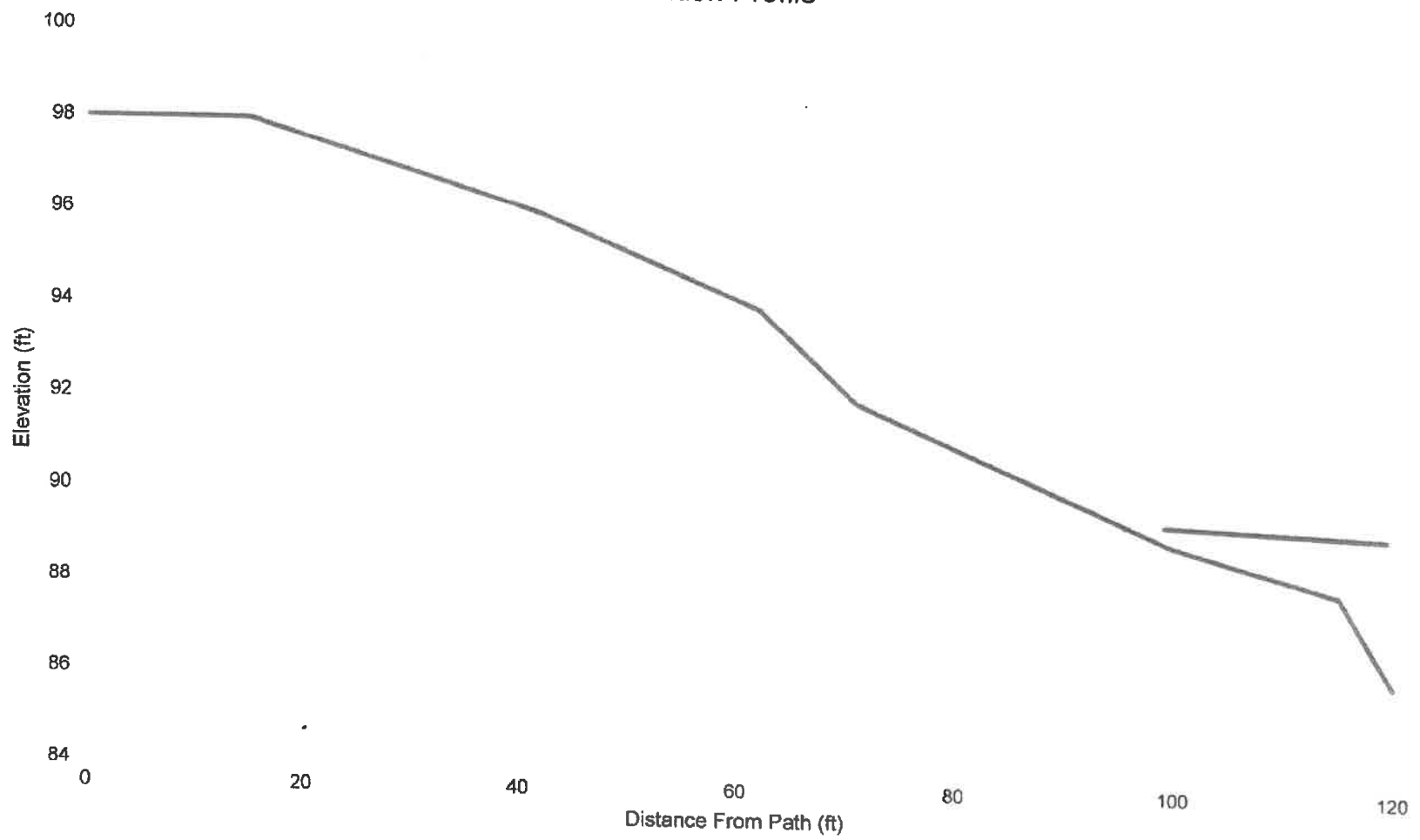

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Figure 10. 2019 Beach Profile

Lake Gardner Beach

City of Amesbury, MA

Lake Gardner Beach Nourishment Plan

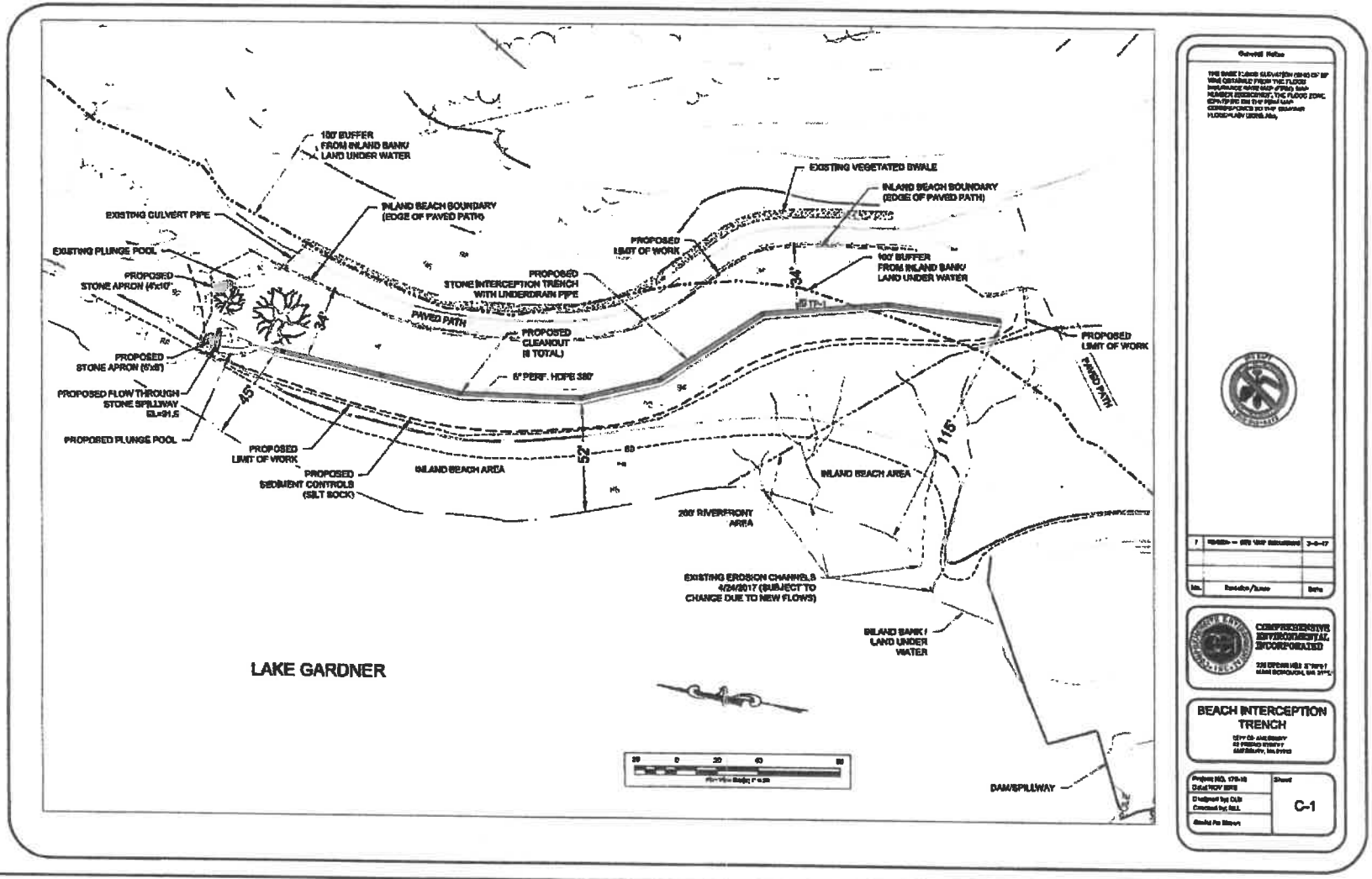

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Figure 11. Current Erosion Channels

Lake Gardner Beach

City of Amesbury, MA

Lake Gardner Beach Nourishment Plan

Appendix A.

Freshwater Mussel Survey in Lake Gardner (Amesbury, Massachusetts) to Assess the Potential Effects of a Proposed Winter Drawdown – 2019

REPORT

Freshwater Mussel Survey in Lake Gardner (Amesbury, Massachusetts) to Assess the Potential Effects of a Proposed Winter Drawdown

NHESP File #10-28441

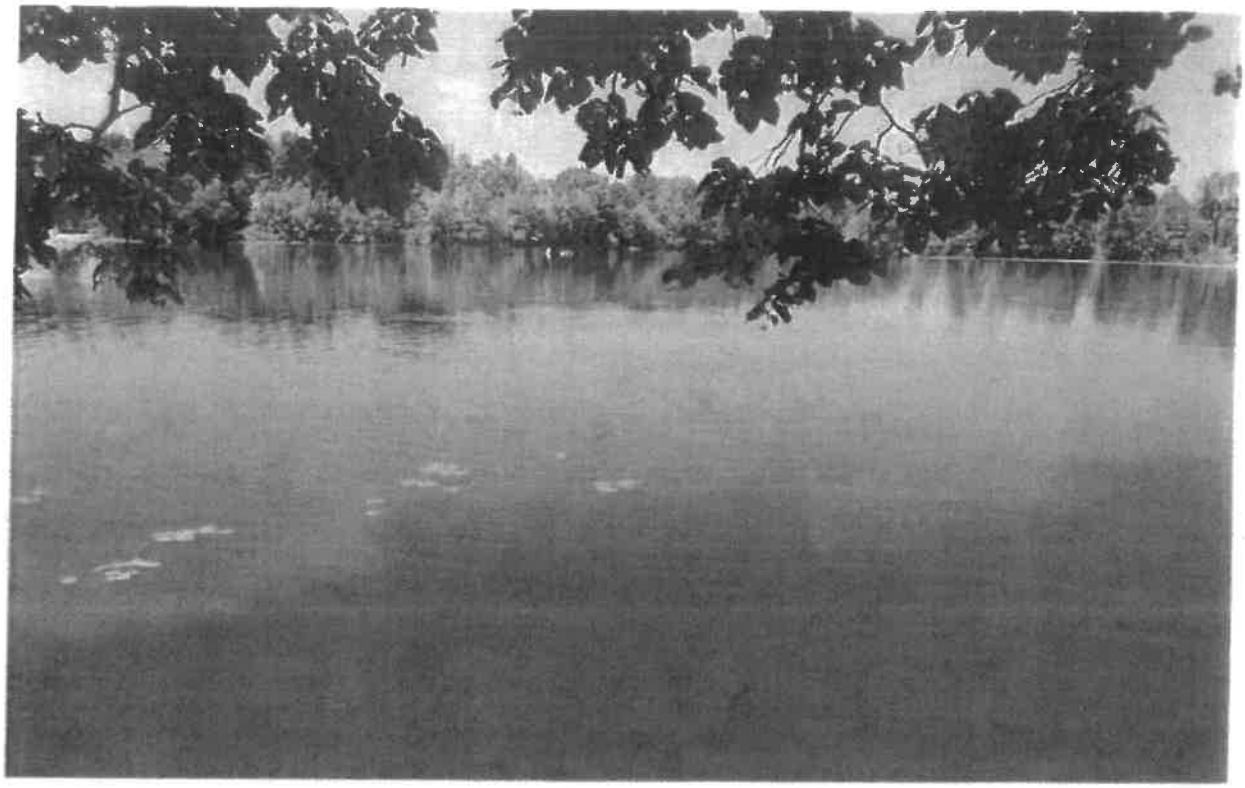
prepared for

Comprehensive Environmental, Inc.
21 Depot Street
Merrimack, NH 03054

prepared by

Biodrawversity LLC
206 Pratt Corner Road
Leverett, MA 01054

August 2019



Lake Gardner in Amesbury, Massachusetts.

INTRODUCTION

Biodrawversity LLC completed a freshwater mussel survey in Lake Gardner in Amesbury, Massachusetts. The study was requested by the Massachusetts Natural Heritage and Endangered Species Program (NHESP), as part of the planning and permitting for a proposed 2 ft winter drawdown of Lake Gardner. The study included a combination of qualitative and quantitative sampling to compare mussel population and habitat parameters in shallow and nearby deeper areas of Lake Gardner, to help understand the potential effect of a 2-ft drawdown on mussel populations and habitat, particularly for the state-listed eastern pondmussel (*Ligumia nasuta*) that occurs in Lake Gardner. Ethan Nedeau developed the study plan was developed in consultation with NHESP, and the *Commercial Scientific Collection Permit* was issued by NHESP prior to the start of fieldwork.

SURVEY DATES AND CONDITIONS

Surveys were conducted over a 3-day period, from July 7-9, 2019. Weather was sunny and warm on all days. Water temperature was in the low 70s.

SURVEY METHODS

Existing bathymetry data, supplemented with additional field measurements in 2019, was used to analyze the spatial extent of the lake bottom that would be exposed or very shallow during a 2-ft drawdown. This also aided in site selection for mussel surveys. Eight locations were selected around the perimeter of Lake Gardner (Figure 1, Table 1). Two plots (shallow

Eastern pondmussel (*Ligumia nasuta*) from Lake Gardner.

Figure 1. Mussel survey sites in Lake Gardner in Amesbury, Massachusetts.

and deep) were established at each location. The shallow plot extended from 0.0 to 1.0 m (0-3 ft) depth, and the deep plot extended from 1.3 to 2.2 m (4.0 to 7.0 ft) depth. Plots were 2.0 m wide and extended from the shallow to deep end of the depth range, perpendicular to the shoreline. Plot length depended on the depth gradient. Biologists conducted qualitative and quantitative sampling within each plot.

Qualitative sampling included a 15-minute timed search within each plot. Biologists recorded the number, shell length, and shell condition of all eastern pondmussels observed. Biologists also recorded abundance indices of co-occurring mussel species, water depth, and the types and percent cover of substrate and cover.

Quantitative sampling included eight 1.0m^2 quadrats per plot (128 quadrats lake-wide). Quadrat placement within plots was selected in a stratified random manner to cover the full range of depths. In each entire quadrat (1.0m^2), biologists recorded location, sur-

Table 1. Site and plot locations and dimensions, and survey dates. In addition to the plot length reported here, all plots were 2.0 meters wide.

		Distance from Shore (meters)					
Plot[1]	Date	@ 1.0 m depth	@ 1.3 m depth	@ 2.2 m depth	Plot Length (m)	Latitude[2]	Longitude[2]
1-S	07/07/19	5.9	-	-	5.9	42.871318	-70.95279
1-D	07/07/19	-	6.8	10.2	4.4		
2-S	07/07/19	6.3	-	-	6.3	42.870101	-70.946729
2-D	07/07/19	-	8.2	12.2	4.0		
3-S	07/07/19	10.2	-	-	10.2	42.867965	-70.946089
3-D	07/07/19	-	10.7	14.1	5.4		
4-S	07/08/19	13.2	-	-	13.2	42.866413	-70.946534
4-D	07/08/19	-	14.2	30.9	25.8		
5-S	07/08/19	7.2	-	-	7.2	42.866131	-70.942975
5-D	07/08/19	-	8.6	13.5	5.1		
6-S	07/08/19	10.4	-	-	10.4	42.863254	-70.94464
6-D	07/08/19	-	13.2	33.3	20.1		
7-S	07/08/19	17.6	-	-	17.6	42.860654	-70.942685
7-D	07/08/19	-	25.0	37.8	12.8		
8-S	07/09/19	16.0	-	-	16.0	42.860836	-70.937998
8-D	07/09/19	-	18.6	34.8	16.2		

1. Eight sites (1-8), with a Shallow (S) and Deep (D) plot at each site.
2. Coordinates recorded with GPS on the left (as facing lakeward) corner of the shallow plot, at the water line. All measurements were taken from this point.

face counts for all mussel species except eastern elliptio, and habitat (water depth, and the types and percent cover of substrate and cover). Biologists recorded the number, shell length, and shell condition of all eastern pondmussels observed. In one-fourth of each quadrat (0.25m²), biologists recorded surface counts of eastern elliptio, and then excavated and sieved the sediment, and recorded buried counts for all mussel species. Counts for buried mussels were recorded separately. Biologists also recorded shell lengths and conditions for up to 25 individuals of all species found during quantitative sampling in each plot.

Shallow plot showing orientation of transect lines.

The analyses compared and contrasted the species composition, catch-per-unit-effort (computed from the timed qualitative surveys), density (computed from the quantitative sampling), and size ranges of mussels in shallow (0.0 - 1.0 m [0.0 - 3.0 ft]) versus deeper (1.3 - 2.2 m [4.0 – 7.0 ft]) areas of Lake Gardner. Based on this analysis, the potential effects of a winter drawdown on the mussel community in Lake Gardner, particularly the eastern pondmussel population, is discussed.

RESULTS

Four species were found during both the qualitative and quantitative sampling, including *Elliptio complanata* (eastern elliptio), *Lampsilis radiata* (eastern lampmussel), *Ligumia nasuta* (eastern pondmussel), and *Pyganodon cataracta* (eastern floater). *E. complanata* comprised approximately 96% of the mussel community. During both types of sampling, only 24 *L. radiata*, 14 *L. nasuta*, and 9 *P. cataracta* were found.

Generally, plots in lower Gardner Lake (sites 5-8) contained more species and higher mussel densities than

Table 2. Results of the timed qualitative mussel surveys within each plot.

		L. nasuta		Abundance Index[3]		
Plot[1]	Duration (hrs)	Count	CPUE[2]	*E. complanata*	*L. radiata*	*P. cataracta*
1-S	0.25	0	0.00	1	0	0
1-D	0.27	0	0.00	1	0	0
2-S	0.30	0	0.00	2	0	1
2-D	0.25	0	0.00	4	0	1
3-S	0.25	0	0.00	2	0	1
3-D	0.27	0	0.00	1	1	1
4-S	0.38	0	0.00	0	0	0
4-D	0.25	0	0.00	1	0	0
5-S	0.25	1	4.00	4	1	0
5-D	0.33	0	0.00	5	1	0
6-S	0.37	3	8.18	4	1	0
6-D	0.25	0	0.00	2	0	0
7-S	0.25	2	8.00	6	1	0
7-D	0.38	1	2.61	5	1	0
8-S	0.37	3	8.18	6	2	0
8-D	0.25	0	0.00	4	0	1
All Shallow Plots	2.4	9	3.55	3.13	0.63	0.25
All Deep Plots	2.3	1	0.33	2.88	0.38	0.38
All Plots	4.7	10	1.94	3.00	0.50	0.31

1. Eight sites (1-8), with a Shallow (S) and Deep (D) plot at each site.
2. CPUE = catch-per-unit-effort, expressed as individuals/hour
3. Abundance Index: 0 = 0, 1 = 1-10, 2 = 11-25, 3 = 26-50, 4 = 51-100, 5 = >100, 6 = >200. These indices are averaged for the shallow plots, deep plots, and all plots combined.

plots in the lake's narrower northern half (Tables 2 and 3). Shallow plots contained more species and higher mussel densities than adjacent deep plots. Based on quantitative sampling, the average mussel density (all species combined) was 4.60 mussels/m² among all plots, or 2.72 mussels/m² in deep plots and 6.48 mussels/m² in shallow plots (Table 3). The highest mussel density was found in Plot 8-S at the southern end of the lake (23.38 mussels/m²), which was driven largely by the high density of *E. complanata*.

Ten *L. nasuta* were found during the qualitative searches; only one was found in the deep plots (Plot 7-D), and the other 9 were found in the shallow plots of sites 5-8, with no more than three counted per plot (Table 2). CPUE was higher in shallow plots (3.55 mussels/hr) than in deep plots (0.33 mussels/hr), and the average among all plots was 1.94 mussels/hr. Six *L. nasuta* were found during the quantitative sampling, only at sites 5-8, and all but one were in shallow plots (Table 3). Based on the quantitative sampling, the density of *L. nasuta* was estimated at 0.08 mussels/m² in shallow plots, 0.02 mussels/m² in deep plots, and 0.05 mussels/m² at all plots combined. Counts and densities of other mussel species are summarized in Tables 2 and 3.

Table 4 summarizes shell length and shell condition data for all four species. Juvenile mussels were not found for three of the species, and only a few juvenile *E. complanata* were detected. *L. nasuta* ranged in length from 56.0 to 90.0 mm (average = 72.7 mm), and exhibited moderate shell erosion with a shell condition index of 0.50. There was not a consistent or notable difference in the shell lengths or shell conditions of mussels occupying shallow versus deep plots, but low sample sizes for *L. nasuta*, *L. radiata*, and *P. cataracta* precludes a more meaningful comparison. Sample sizes were adequate for *E. complanata*, and length data for this species are generally consistent between shallow and deep plots.

Habitat data collected for each plot (Table 5) and for individual quadrats within each plot (Table 6) show some consistent differences among plots. Deeper plots contained 2x more silt, and shallow plots had

Table 3. Summary of mussel densities (mussels/m²) calculated from the quantitative survey data. See Appendix 1 for raw data.

	Density (mussels/m²)				
Plot[1]	*L. nasuta*	*L. radiata*	*P. cataracta*	*E. complanata*	All Species
1-S	0.00	0.00	0.00	0.00	0.00
1-D	0.00	0.00	0.00	1.50	1.50
2-S	0.00	0.00	0.25	5.00	5.25
2-D	0.00	0.00	0.00	3.50	3.50
3-S	0.00	0.00	0.00	3.50	3.50
3-D	0.00	0.13	0.38	3.00	3.50
4-S	0.00	0.00	0.00	0.00	0.00
4-D	0.00	0.00	0.00	0.00	0.00
5-S	0.13	0.13	0.00	7.00	7.25
5-D	0.00	0.00	0.00	0.00	0.00
6-S	0.13	0.25	0.00	2.50	2.88
6-D	0.00	0.00	0.00	1.50	1.50
7-S	0.13	0.00	0.00	9.50	9.63
7-D	0.00	0.00	0.00	4.00	4.00
8-S	0.25	0.63	0.00	22.50	23.38
8-D	0.13	0.63	0.00	7.00	7.75
All Shallow Plots	0.08	0.13	0.03	6.25	6.48
All Deep Plots	0.02	0.09	0.05	2.56	2.72
All Plots	0.05	0.11	0.04	4.41	4.60

1. Eight sites (1-8), with a Shallow (S) and Deep (D) plot at each site.

Table 4. Shell length and condition statistics for the four mussel species found during the survey, in shallow versus deep plots.

	L. nasuta[1]		*L. radiata*		*P. cataracta*		*E. complanata*	
Statistic	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep
Sample Size	12	2	18	6	4	5	152	140
Min Length (mm)	56	53	57	61	66	65	30	46
Max Length (mm)	90	83	94	101	123	106	108	94
Average Length (mm)	72.7	68.0	73.6	83.2	87.0	83.2	77.8	79.4
Shell Condition[2]	0.50	0.25	0.47	0.42	0.38	0.30	0.40	0.33
Length Classes								
<20.0 mm	0	0	0	0	0	0	0	0
20.0 - 29.9 mm	0	0	0	0	0	0	0	0
30.0 - 39.9 mm	0	0	0	0	0	0	3	0
40.0 - 49.9 mm	0	0	0	0	0	0	2	1
50.0 - 59.9 mm	2	1	1	0	0	0	1	2
60.0 - 69.9 mm	2	0	8	1	2	1	24	9
70.0 - 79.9 mm	5	0	3	1	0	2	52	62
80.0 - 89.9 mm	2	1	4	2	0	0	46	46
90.0 - 99.9 mm	1	0	2	1	1	0	23	20
>100.0 mm	0	0	0	1	1	2	1	0

1. Although 16 *L. nasuta* were counted during qualitative and quantitative sampling, two individuals were found by both methods. Thus, actual sample size is 14.
2. **Shell condition** refers to degree of shell erosion, which is given one of 5 numeric ranks for each individual in a sample. 0 = little/no shell erosion, 0.25 = light shell erosion, 0.50 = moderate shell erosion, 0.75 = moderate/heavy shell erosion, 1.0 = heavy shell erosion. A **shell condition index** ranging from 0 to 1 is the average of these shell condition values.

Eastern elliptio (*Elliptio complanata*) from Lake Gardner.

higher amounts of sand, fine gravel, and coarse gravel. Vegetation cover was similar in deep and shallow plots, although the species composition was likely different (this was not always recorded). Clay and cobble were rarely observed.

DISCUSSION

Results indicate a mussel community comprised of four species, distributed throughout Lake Gardner but with highest densities in the large southern basin (sites 5-8). The community is dominated by *E. complanata* that comprised 96% of mussels found during quantitative sampling, and this was the only species for which juvenile mussels were found. The state-listed *L. nasuta* does occur in Lake Gardner. Only 14 *L. nasuta* were found; average CPUE was 1.94 mussels/hr among plots, and average density was 0.05 mussels/m^2 (or 1 every 20.0m^2).

Shallow plots contained higher mussel densities than adjacent deep plots. Based on quantitative sampling, the average mussel density (all species combined) was 2.72 mussels/m^2 in deep plots and 6.48 mussels/m^2 in shallow plots. Three species exhibited the same pattern of higher density in shallow plots, whereas *P. cataracta* was slightly more numerous in the deeper plots. Higher mussel densities in shallow areas of Lake Gardner may be due to several factors, such as better substrate quality (i.e., more sand and gravel) in shallow areas, higher dissolved oxygen in shallow areas (though this was not measured for this study), and host fishes that prefer nearshore areas.

The shallow plots spanned the depth range that is affected by winter drawdowns (<1.0 m or 3.0 ft), and the depth range for the adjacent deep plots was selected because these areas remain fully submerged during winter drawdowns. Data suggest that a 3.0-ft drawdown can have a disproportionate effect on Lake Gardner's mussel community, including the state-listed *L. nasuta*, since mussels disproportionately occupy these shallow areas. However, the results are interesting because there is a history of winter drawdowns in Lake Gardner [note: this Discussion would benefit from a timeline of past drawdowns, both years and the drawdown depth], as recently as 2017/2018 (a 2-ft drawdown), and yet nearshore areas still retain the highest mussel densities in the lake.

It is possible that mussels that occupy nearshore areas of Lake Gardner survive drawdowns by either remaining buried and dormant during the drawdown, or by moving downslope into deeper areas during the drawdown and then moving back into shallow areas in the spring. There was no drawdown in the winter of 2018-2019, and mussels had ample time to recolonize shallow areas from spring 2018 to summer 2019 when this study was conducted. It is also possible that drawdowns cause mussel mortality, and that mussel densities in shallow areas of Lake Gardner are lower than they could be in the absence of drawdowns. However, we saw no evidence of heavy mortality (shells) in shallow areas that we could attribute to a drawdown.

It would be difficult to fully understand the effects of a seasonal drawdown without direct observation during the drawdown to document mussel movement and mortality. If further drawdowns are planned, this would be a prudent step because this study suggests that a significant proportion of the Lake Gardner's mussel community, including the state-listed *L. nasuta*, exists in areas that may be dewatered during a drawdown.

Table 5. Summary of substrate and vegetation data recorded for the qualitative survey within each plot.

PLOT[1]	% CLAY	% SILT	% SAND	% FGRAV[2]	% CGRAV[2]	% COBB[2]	% VEG[2]
1-S	0	40	58	2	0	0	90
1-D	10	75	10	0	0	5	35
2-S	0	25	40	10	10	15	20
2-D	0	30	40	20	8	2	80
3-S	0	15	15	35	35	0	5
3-D	0	90	5	0	0	5	10
4-S	0	80	15	0	0	5	75
4-D	0	100	0	0	0	0	95
5-S	3	20	45	15	15	2	5
5-D	0	20	40	10	20	10	10
6-S	0	30	50	10	10	0	40
6-D	0	80	20	0	0	0	70
7-S	0	20	65	10	2	3	40
7-D	40	40	20	0	0	0	10
8-S	0	15	45	15	20	5	30
8-D	0	70	15	5	5	5	30
All Shallow Plots	0.4	30.6	41.6	12.1	11.5	3.8	38.1
All Deep Plots	6.3	63.1	18.8	4.4	4.1	3.4	42.5
All Plots	3.3	46.9	30.2	8.3	7.8	3.6	40.3

1. Eight sites (1-8), with a Shallow (S) and Deep (D) plot at each site.
2. Substrate abbreviations: FGRAV = fine gravel, CGRAV = coarse gravel, COBB = cobble, VEG = aquatic vegetation (emergent or submergent)

Table 6. Average depth and percent cover for substrate and vegetation in quadrats (n = 8 per plot) for the quantitative survey within each plot.

Plot	DEPTH (m)	% CLAY	% SILT	% SAND	% FGRAV	% CGRAV	% COBB	% VEG
1-S	0.44	0.0	56.3	42.9	0.9	0.0	0.0	76.9
1-D	1.75	3.8	85.0	8.8	0.0	0.0	2.5	26.3
2-S	0.68	0.0	26.3	30.0	10.0	10.0	23.8	5.0
2-D	1.81	0.0	51.9	24.4	11.3	11.3	1.3	22.5
3-S	0.56	0.0	16.9	13.8	35.6	33.8	0.0	1.4
3-D	1.66	0.0	71.9	7.5	3.1	4.4	13.1	12.1
4-S	0.54	0.0	86.9	11.3	0.0	0.0	1.9	50.6
4-D	1.55	0.0	100.0	0.0	0.0	0.0	0.0	90.6
5-S	0.49	1.3	23.1	27.5	18.1	25.6	4.4	2.3
5-D	1.79	0.0	29.4	20.6	18.1	30.0	1.9	17.9
6-S	0.45	0.0	25.6	66.3	7.5	0.6	0.0	34.4
6-D	1.73	0.0	83.8	16.3	0.0	0.0	0.0	64.4
7-S	0.69	0.0	22.5	66.3	10.0	1.3	0.0	48.8
7-D	1.71	35.6	53.1	8.8	0.6	0.0	1.9	10.0
8-S	0.54	0.0	8.8	36.9	21.9	24.4	8.1	26.9
8-D	1.61	0.0	66.3	15.6	3.8	5.6	8.8	36.3
All Shallow Plots	0.5	0.2	33.3	36.8	13.0	12.0	4.8	31.6
All Deep Plots	1.7	4.9	67.7	12.7	4.6	6.4	3.7	36.1
All Plots	1.1	2.5	50.5	24.8	8.8	9.2	4.2	33.8

1. Eight sites (1-8), with a Shallow (S) and Deep (D) plot at each site.
2. Substrate abbreviations: FGRAV = fine gravel, CGRAV = coarse gravel, COBB = cobble, VEG = aquatic vegetation (emergent or submergent)

Appendix 1. Species counts and calculated densities for the quantitative sampling in each plot.

	Surface Counts[2,3]				Buried Counts[4]		Calculated Density (mussels/m²)				
	1.0m²			0.25m²	0.25m²						
Quadrat[1]	LaRa	LiNa	PyCa	ElCo	ElCo	LaRa	LiNa	LaRa	PyCa	ElCo	All
1-S-1	0	0	0	0	0	0	0	0	0	0	0
1-S-2	0	0	0	0	0	0	0	0	0	0	0
1-S-3	0	0	0	0	0	0	0	0	0	0	0
1-S-4	0	0	0	0	0	0	0	0	0	0	0
1-S-5	0	0	0	0	0	0	0	0	0	0	0
1-S-6	0	0	0	0	0	0	0	0	0	0	0
1-S-7	0	0	0	0	0	0	0	0	0	0	0
1-S-8	0	0	0	0	0	0	0	0	0	0	0
1-D-1	0	0	0	0	0	0	0	0	0	0	0
1-D-2	0	0	0	1	0	0	0	0	0	4	4
1-D-3	0	0	0	0	0	0	0	0	0	0	0
1-D-4	0	0	0	1	0	0	0	0	0	4	4
1-D-5	0	0	0	0	0	0	0	0	0	0	0
1-D-6	0	0	0	0	0	0	0	0	0	0	0
1-D-7	0	0	0	1	0	0	0	0	0	4	4
1-D-8	0	0	0	0	0	0	0	0	0	0	0
2-S-1	0	0	0	3	0	0	0	0	0	12	12
2-S-2	0	0	0	0	0	0	0	0	0	0	0
2-S-3	0	0	0	0	0	0	0	0	0	0	0
2-S-4	0	0	0	0	0	0	0	0	0	0	0
2-S-5	0	0	1	1	1	0	0	0	1	8	9
2-S-6	0	0	0	0	0	0	0	0	0	0	0
2-S-7	0	0	1	3	0	0	0	0	1	12	13
2-S-8	0	0	0	2	0	0	0	0	0	8	8
2-D-1	0	0	0	2	0	0	0	0	0	8	8
2-D-2	0	0	0	1	0	0	0	0	0	4	4
2-D-3	0	0	0	3	0	0	0	0	0	12	12
2-D-4	0	0	0	0	0	0	0	0	0	0	0
2-D-5	0	0	0	1	0	0	0	0	0	4	4
2-D-6	0	0	0	0	0	0	0	0	0	0	0
2-D-7	0	0	0	0	0	0	0	0	0	0	0
2-D-8	0	0	0	0	0	0	0	0	0	0	0
3-S-1	0	0	0	1	0	0	0	0	0	4	4
3-S-2	0	0	0	1	0	0	0	0	0	4	4
3-S-3	0	0	0	0	0	0	0	0	0	0	0
3-S-4	0	0	0	1	1	0	0	0	0	8	8
3-S-5	0	0	0	2	0	0	0	0	0	8	8
3-S-6	0	0	0	0	0	0	0	0	0	0	0
3-S-7	0	0	0	1	0	0	0	0	0	4	4
3-S-8	0	0	0	0	0	0	0	0	0	0	0
3-D-1	0	0	0	0	0	0	0	0	0	0	0
3-D-2	0	0	1	1	0	0	0	0	1	4	5
3-D-3	0	0	0	0	0	0	0	0	0	0	0
3-D-4	0	0	1	3	0	0	0	0	1	12	13
3-D-5	0	0	0	0	0	0	0	0	0	0	0
3-D-6	1	0	1	0	0	0	0	1	1	0	2
3-D-7	0	0	0	1	0	0	0	0	0	4	4
3-D-8	0	0	0	1	0	0	0	0	0	4	4
4-S-1	0	0	0	0	0	0	0	0	0	0	0
4-S-2	0	0	0	0	0	0	0	0	0	0	0
4-S-3	0	0	0	0	0	0	0	0	0	0	0
4-S-4	0	0	0	0	0	0	0	0	0	0	0
4-S-5	0	0	0	0	0	0	0	0	0	0	0
4-S-6	0	0	0	0	0	0	0	0	0	0	0

1. Numbers correspond to Site (1-8), Plot (Shallow (S) and Deep (D)), and Quadrat (1-8).
2. For surface counts, three species were counted within the full 1.0m² quadrat, and one species was counted within one-fourth of the quadrat
3. Species abbreviations: LiNa = *Ligumia nasuta*, LaRa = *Lampsilis radiata*, PyCa = *Pyganodon cataracta*, and ElCo = *Elliptio complanata*
4. For buried counts, species were counted only within the excavated portion (0.25m²) of each quadrat. Only two species were found buried.

Appendix 1. (continued)

	Surface Counts[2,3]				Buried Counts[4]		Calculated Density (mussels/m²)				
	1.0m²			0.25m²	0.25m²						
Quadrat[1]	LaRa	LiNa	PyCa	ElCo	ElCo	LaRa	LiNa	LaRa	PyCa	ElCo	All
4-S-7	0	0	0	0	0	0	0	0	0	0	0
4-S-8	0	0	0	0	0	0	0	0	0	0	0
4-D-1	0	0	0	0	0	0	0	0	0	0	0
4-D-2	0	0	0	0	0	0	0	0	0	0	0
4-D-3	0	0	0	0	0	0	0	0	0	0	0
4-D-4	0	0	0	0	0	0	0	0	0	0	0
4-D-5	0	0	0	0	0	0	0	0	0	0	0
4-D-6	0	0	0	0	0	0	0	0	0	0	0
4-D-7	0	0	0	0	0	0	0	0	0	0	0
4-D-8	0	0	0	0	0	0	0	0	0	0	0
5-S-1	0	1	0	0	0	0	1	0	0	0	1
5-S-2	0	0	0	0	0	0	0	0	0	0	0
5-S-3	0	0	0	6	0	0	0	0	0	24	24
5-S-4	0	0	0	2	0	0	0	0	0	8	8
5-S-5	1	0	0	2	0	0	0	1	0	8	9
5-S-6	0	0	0	3	0	0	0	0	0	12	12
5-S-7	0	0	0	1	0	0	0	0	0	4	4
5-S-8	0	0	0	0	0	0	0	0	0	0	0
5-D-1	0	0	0	0	0	0	0	0	0	0	0
5-D-2	0	0	0	0	0	0	0	0	0	0	0
5-D-3	0	0	0	0	0	0	0	0	0	0	0
5-D-4	0	0	0	0	0	0	0	0	0	0	0
5-D-5	0	0	0	0	0	0	0	0	0	0	0
5-D-6	0	0	0	0	0	0	0	0	0	0	0
5-D-7	0	0	0	0	0	0	0	0	0	0	0
5-D-8	0	0	0	0	0	0	0	0	0	0	0
6-S-1	0	1	0	0	0	0	1	0	0	0	1
6-S-2	0	0	0	0	1	0	0	0	0	4	4
6-S-3	0	0	0	1	0	0	0	0	0	4	4
6-S-4	0	0	0	0	0	0	0	0	0	0	0
6-S-5	1	0	0	1	0	0	0	1	0	4	5
6-S-6	0	0	0	0	0	0	0	0	0	0	0
6-S-7	1	0	0	2	0	0	0	1	0	8	9
6-S-8	0	0	0	0	0	0	0	0	0	0	0
6-D-1	0	0	0	2	0	0	0	0	0	8	8
6-D-2	0	0	0	0	0	0	0	0	0	0	0
6-D-3	0	0	0	0	0	0	0	0	0	0	0
6-D-4	0	0	0	1	0	0	0	0	0	4	4
6-D-5	0	0	0	0	0	0	0	0	0	0	0
6-D-6	0	0	0	0	0	0	0	0	0	0	0
6-D-7	0	0	0	0	0	0	0	0	0	0	0
6-D-8	0	0	0	0	0	0	0	0	0	0	0
7-S-1	0	0	0	5	0	0	0	0	0	20	20
7-S-2	0	0	0	3	0	0	0	0	0	12	12
7-S-3	0	0	0	1	0	0	0	0	0	4	4
7-S-4	0	0	0	4	0	0	0	0	0	16	16
7-S-5	0	0	0	1	0	0	0	0	0	4	4
7-S-6	0	0	0	0	0	0	0	0	0	0	0
7-S-7	0	0	0	2	0	0	0	0	0	8	8
7-S-8	0	1	0	3	0	0	1	0	0	12	13
7-D-1	0	0	0	0	0	0	0	0	0	0	0
7-D-2	0	0	0	1	0	0	0	0	0	4	4
7-D-3	0	0	0	0	0	0	0	0	0	0	0
7-D-4	0	0	0	2	0	0	0	0	0	8	8
7-D-5	0	0	0	1	0	0	0	0	0	4	4
7-D-6	0	0	0	1	0	0	0	0	0	4	4
7-D-7	0	0	0	0	0	0	0	0	0	0	0
7-D-8	0	0	0	3	0	0	0	0	0	12	12

Appendix 1. (continued)

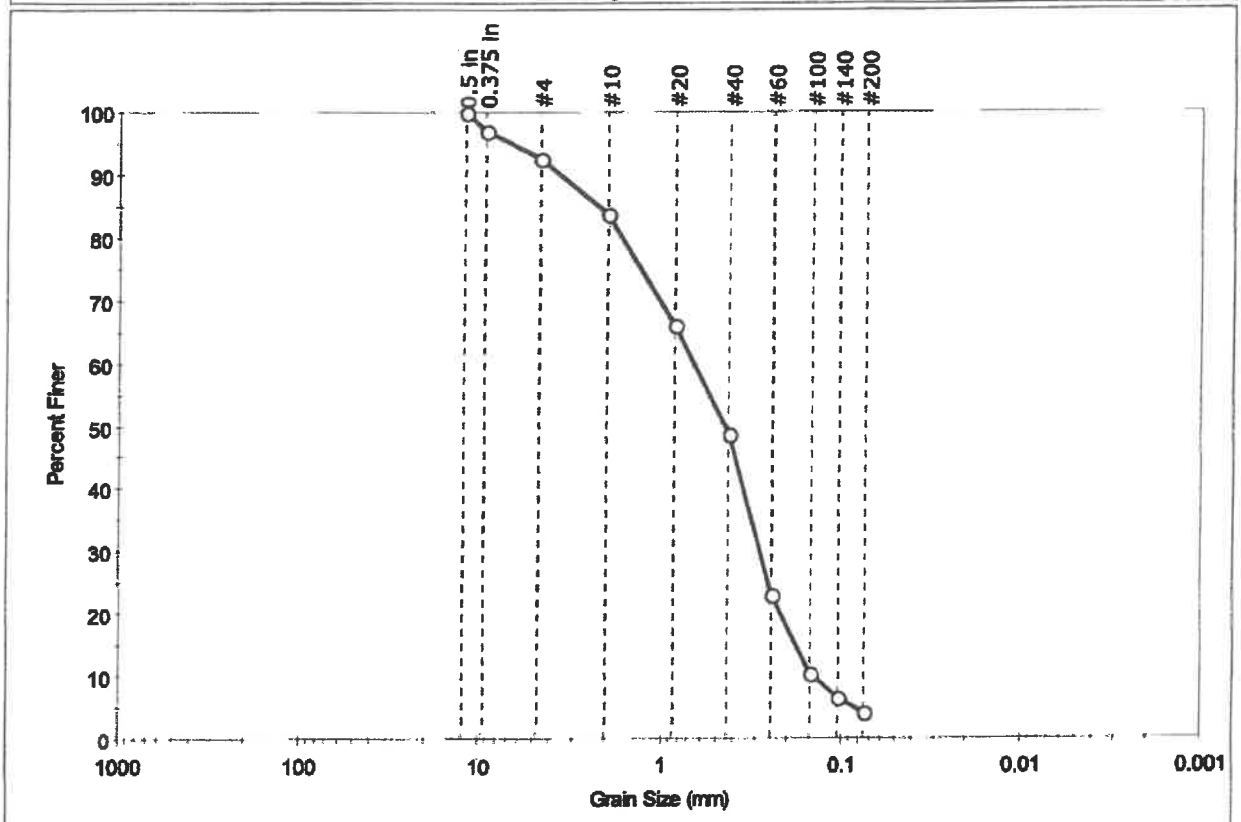
	Surface Counts[2,3]				Buried Counts[4]		Calculated Density (mussels/m²)				
	1.0m²			0.25m²	0.25m²						
Quadrat[1]	LaRa	LiNa	PyCa	ElCo	ElCo	LaRa	LiNa	LaRa	PyCa	ElCo	All
8-S-1	0	0	0	0	0	0	0	0	0	0	0
8-S-2	0	0	0	0	0	0	0	0	0	0	0
8-S-3	1	0	0	4	0	0	0	1	0	16	17
8-S-4	0	0	0	4	0	0	0	0	0	16	16
8-S-5	2	0	0	9	1	0	0	2	0	40	42
8-S-6	1	0	0	11	0	0	0	1	0	44	45
8-S-7	0	1	0	6	0	0	1	0	0	24	25
8-S-8	1	1	0	8	2	0	1	1	0	40	42
8-D-1	0	0	0	0	0	0	0	0	0	0	0
8-D-2	0	0	0	0	0	0	0	0	0	0	0
8-D-3	0	0	0	2	0	0	0	0	0	8	8
8-D-4	1	0	0	1	0	0	0	1	0	4	5
8-D-5	0	0	0	0	0	0	0	0	0	0	0
8-D-6	0	1	0	1	0	0	1	0	0	4	5
8-D-7	0	0	0	4	1	1	0	4	0	20	24
8-D-8	0	0	0	5	0	0	0	0	0	20	20

Appendix B.
Laboratory Report

GeoTesting EXPRESS

Client:	Comprehensive Environmental Inc.				
Project:	Lake Gardner Beach Nourishment				
Location:	Amesbury, MA			Project No:	GTX-310303
Boring ID:	---	Sample Type:	jar	Tested By:	ckg
Sample ID:	Composite	Test Date:	07/22/19	Checked By:	bfs
Depth :	---	Test Id:	514345		
Test Comment:	---				
Visual Description:	Moist, dark yellowish brown sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
–	7.4	88.4	4.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	97		
#4	4.75	93		
#10	2.00	84		
#20	0.85	66		
#40	0.42	49		
#60	0.25	23		
#100	0.15	10		
#140	0.11	7		
#200	0.075	4.2		

Coefficients

D_{85} = 2.2325 mm D_{30} = 0.2891 mm
D_{60} = 0.6691 mm D_{15} = 0.1814 mm
D_{50} = 0.4503 mm D_{10} = 0.1464 mm
C_u = 4.570 C_c = 0.853

Classification

ASTM Poorly graded SAND (SP)

AASHTO Stone Fragments, Gravel and Sand (A-1-b (1))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Appendix C.

Activity & Inspection Report Templates

Lake Gardner Beach Nourishment Activity Form

Date: **Start Time:** **End Time:**

Name/Dept: **Weather Conditions:**

Activity Documentation		Notes/Concerns
Amount of Sand Deposited (note units - cubic yards, tons):		
Source of Material (name of seller, address of location of origin):		
Material Cost (dollar amount):		
Source Material Average Grain Size (lab report attached):		
Current Water Elevation:		
Deviation from Order of Conditions (Yes/No) if Yes explain in notes below		

Additional Notes/Observations/Concerns:

Date of Next Planned Inspection:

Required Attachments:

- ☐ Before/After Photographs
- ☐ Grain Size Laboratory Report
- ☐ Documentation of Source Material (sales receipt, invoice, bill of lading etc.)
- ☐ Order of Conditions

Amesbury, Massachusetts

Lake Gardner Beach Nourishment Inspection Form

Date: Time: Name/Dept:

Type of Inspection (annual/ quarterly/ weather event-describe):

Notable Changes/ Damage to Beach	Possible Sources	Recommended Corrective Action (include schedule and entity responsible)

Beach Shape Changes:

Additional Notes/Observations:

- ☐ Photographs attached (required each inspection)
- ☐ Beach profile (required annually)

Amesbury, Massachusetts

Appendix D.
Site Photographs

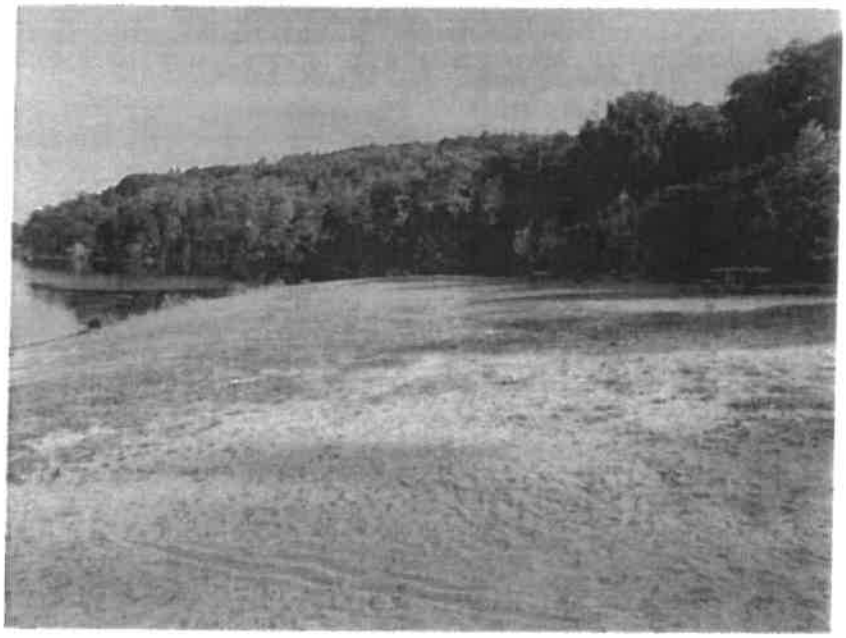


Photo 1 Northeast Beach View

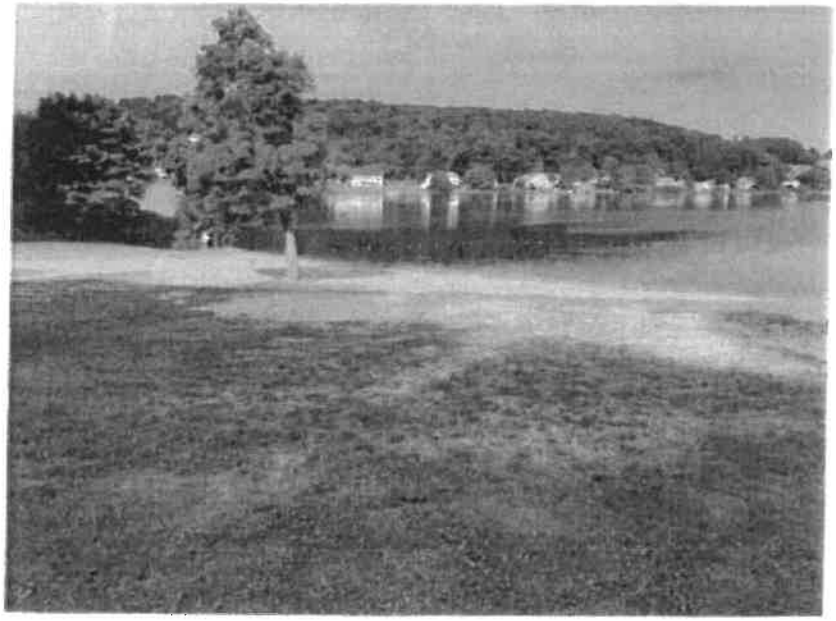


Photo 2. Northwest Beach View

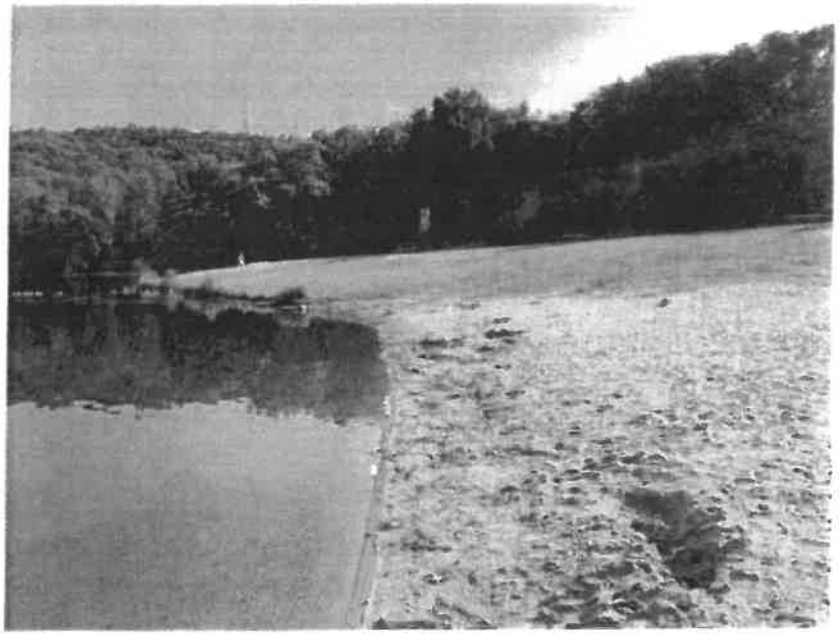


Photo 3. Shoreline View

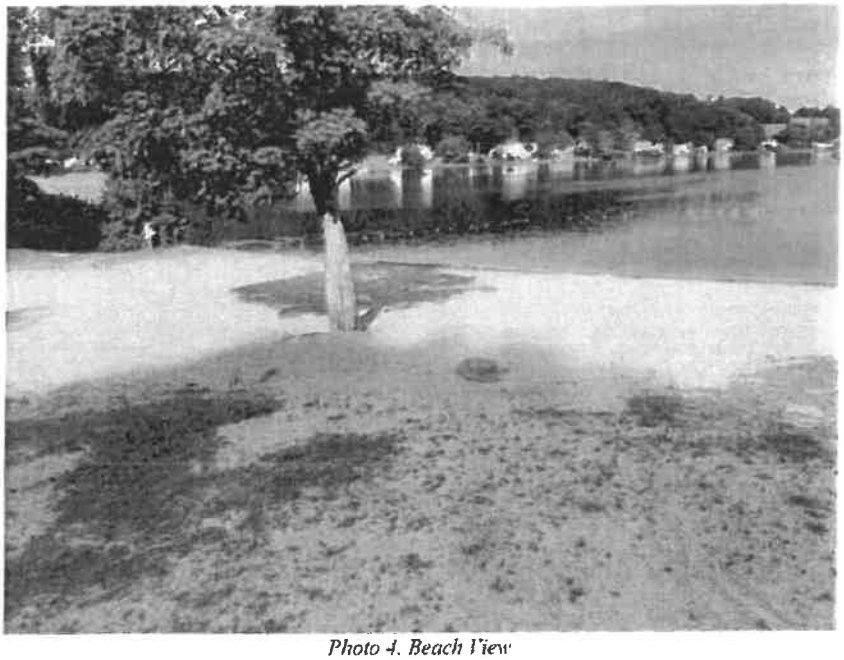
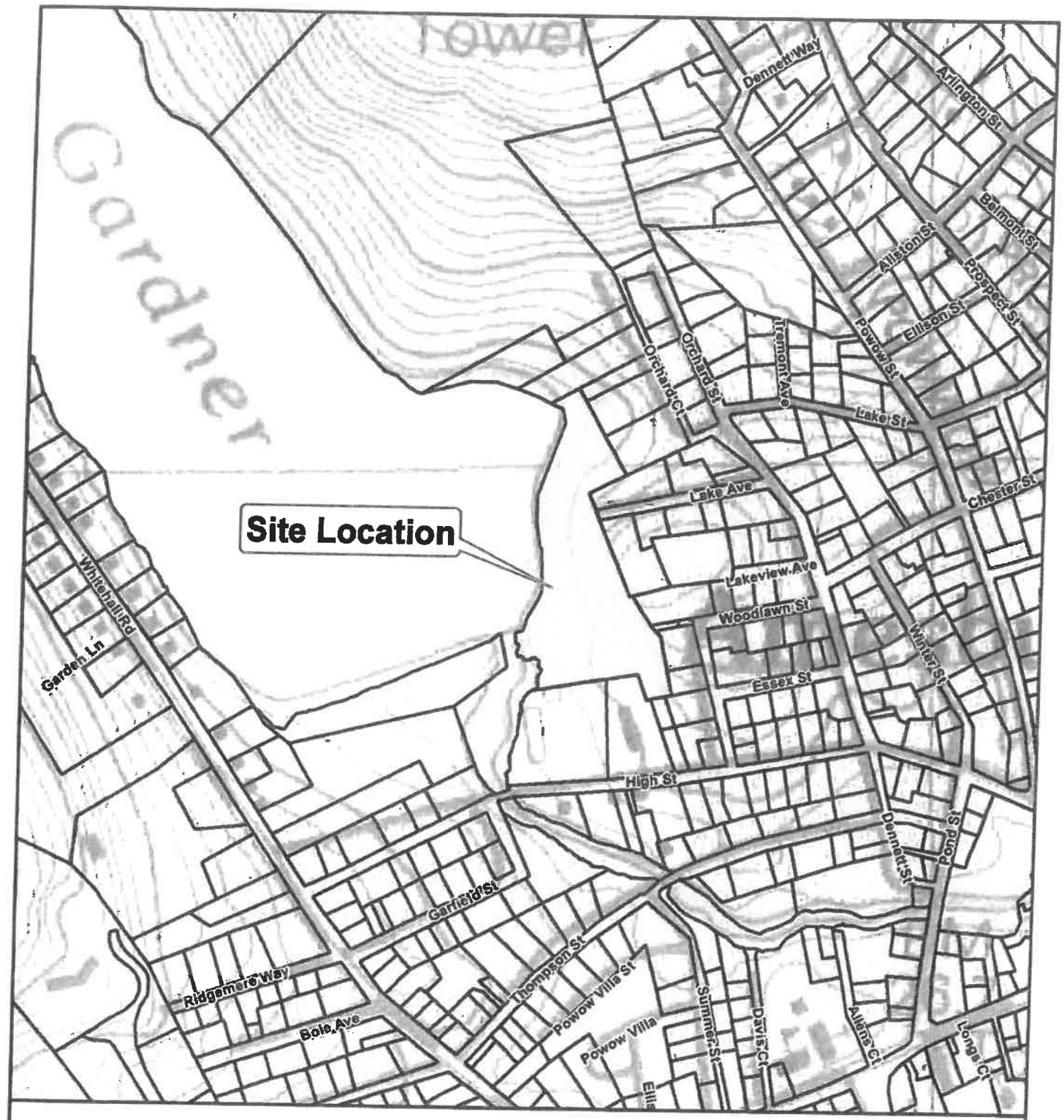


Photo 4. Beach View

Photo 5. Full Park View

Photo 6. Parking Lot

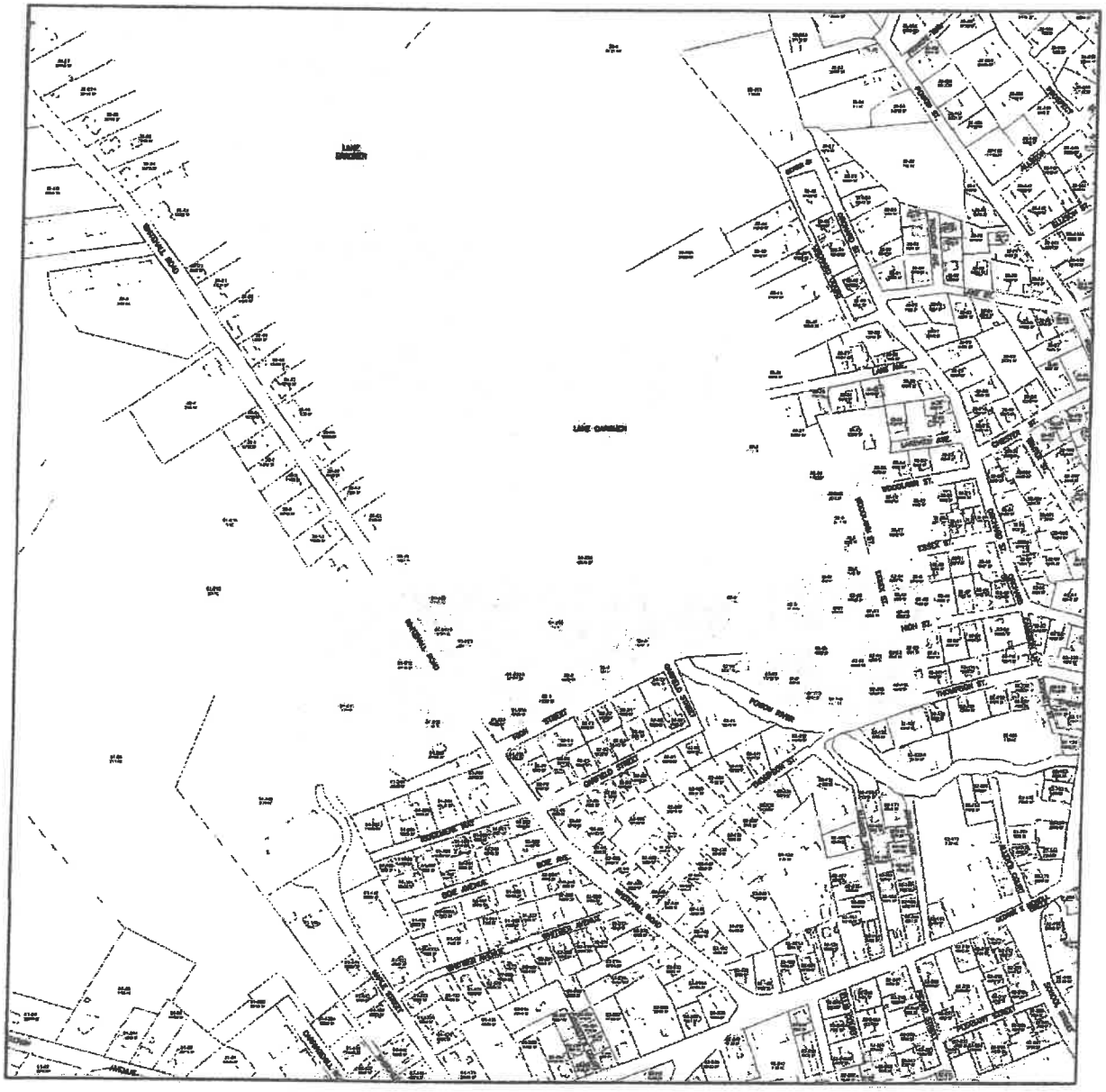


USGS Map with Property Boundaries

Amesbury Public Beach

Comprehensive Environmental Inc.

79 HIGH ST - 51/226, 52/38, 52/37, 39/2 - 300'



GEOGRAPHIC INFORMATION SYSTEM

VISION APPRAISAL TECHNOLOGY

Property Location: 79 HIGH ST
Vision ID: 1229 **Account #** **MAP ID:** 39/ / 2/ / **Bldg #:** 1 of 1 **Bldg Name:** **Sec #:** 1 of 1 **Card** 1 **of** 1 **State Use:** 9310 **Print Date:** 04/22/2021 11:08

CURRENT OWNER	TOPO.	UTILITIES	STRT./ROAD	LOCATION
AMESBURY CITY OF TOWN SWIMMING AREA TOWN HALL AMESBURY, MA 01913 Additional Owners:	2 High 4 Rolling	1 All Public	1 Paved 6 Sidewalk	1 Urban 7 Waterfront 9 TOWN LINE

SUPPLEMENTAL DATA

Other ID: 00016 00000 00093	Use Change
Sub-Div	Original Lot
Spec.Cond.	NOTES
OWNER OCCU	STYLE
ABC F02 F96 F92	CHAPTER L
AB APPLIC #	
GIS ID: M_245962_956807	ASSOC PID#

CURRENT ASSESSMENT

Description	Code	Appraised Value	Assessed Value
EXEMPT	9310	28,600	28,600
EXM LAND	9310	365,400	365,400
EXEMPT	9310	105,300	105,300
		Total	499,300	499,300

101 AMESBURY, MA

VISION

RECORD OF OWNERSHIP

BK-VOL/PAGE	SALE DATE	q/u	v/i	SALE PRICE	V.C.
AMESBURY CITY OF	5476/ 126	09/15/1967	U	I	1	1N

PREVIOUS ASSESSMENTS (HISTORY)

Yr.	Code	Assessed Value	Yr.	Code	Assessed Value	Yr.	Code	Assessed Value
2021	9310	28,600	2020	9310	28,600	2019	9310	27,100
2021	9310	365,400	2020	9310	365,400	2019	9310	319,000
2021	9310	105,300	2020	9310	105,300	2019	9310	105,300
		Total: 499,300			Total: 499,300			Total: 451,400

EXEMPTIONS

Year	Type	Description	Amount
		Total:	

OTHER ASSESSMENTS

Code	Description	Number	Amount	Comm. Int.

This signature acknowledges a visit by a Data Collector or Assessor

ASSESSING NEIGHBORHOOD

NBHD/ SUB	NBHD Name	Street Index Name	Tracing	Batch
0001/A				

APPRAISED VALUE SUMMARY

Appraised Bldg. Value (Card)	28,600
Appraised XF (B) Value (Bldg)	0
Appraised OB (L) Value (Bldg)	105,300
Special Land Value	365,400
Total Appraised Parcel Value	0
Valuation Method:	499,300
	C
Adjustment:	0
Net Total Appraised Parcel Value	499,300

NOTES

BATH HSE TOWN OF AMESBURY
COMB PAR 2,3,4 FY00

BUILDING PERMIT RECORD

Permit ID	Issue Date	Type	Description	Amount	Insp. Date	% Comp.	Date Comp.	Comments
01-24	07/06/2001	RE	Remodel	15,000	10/20/2002	100	06/30/2002	REBUILD SPILLWAY
90-321	09/19/1990	CM	Commercial	0	07/10/1991	100	10/30/1990	BATH HOUSE

VISIT/ CHANGE HISTORY

Date	Type	IS	ID	Cd.	Purpose/Result
07/27/2016			CW	ML	Measure & List
02/26/2007			RD	04	Measur/Vac/Boarded up
10/20/2002			HF	BP	Building Permit
06/19/1995			HF	DQ	Data Quality
07/10/1991			HF	BP	Building Permit

LAND LINE VALUATION SECTION

B #	Use Code	Use Description	Zone	D	Front	Depth	Units		Unit Price	I. Factor	S.A.	Acre Disc	C. Factor	ST. Idx	Adj.	Notes- Adj	Special Pricing	S Adj Fact	Adj. Unit Price	Land Value
1	9310	Town C	OSC		42	960	43,560	SF	3.71	2.0000	U	1.0000	1.00		0.00			1.00	7.42	323,200
1	9310	Town C	OSC		42	960	4.02	AC	10,500.00	1.0000	0	1.0000	1.00		0.00			1.00	10,500.00	42,200

Total Card Land Units: 218,671 SF | Parcel Total Land Area: 218,671 SF | Total Land Value: 365,400

Property Location: 79 HIGH ST
Vision ID: 1229 **Account #** **MAP ID:** 39/ / 2/ / **Bldg Name:** **State Use:** 9310
Bldg #: 1 of 1 **Sec #:** 1 of 1 **Card** 1 of 1 **Print Date:** 04/22/2021 11:08

CONSTRUCTION DETAIL

Element	Cd.	Ch.	Description
Style	40		Light Industrial
Model	96		Ind/Comm
Grade	03		Average
Stories	1		
Occupancy	1		
Exterior Wall 1	23		Pre-cast Concr
Exterior Wall 2			
Roof Structure	01		Flat
Roof Cover	04		Tar & Gravel
Interior Wall 1	01		Minim/Masonry
Interior Wall 2	01		Minim/Masonry
Interior Floor 1	03		Concr-Finished
Interior Floor 2	05		Vinyl/Asphalt
Heating Fuel	01		Coal or Wood
Heating Type	01		None
AC Type	01		None
Bldg Use	9310		Town C
Total Rooms			
Total Bedrms	00		
Total Baths	2		
Heat/AC	02		HEAT/AC SPLIT
Frame Type	03		MASONRY
Baths/Plumbing	02		AVERAGE
Ceiling/Wall	01		SUSP-CEIL ONLY
Rooms/Prtns	02		AVERAGE
Wall Height	10		
% Comn Wall	0		

CONSTRUCTION DETAIL (CONTINUED)

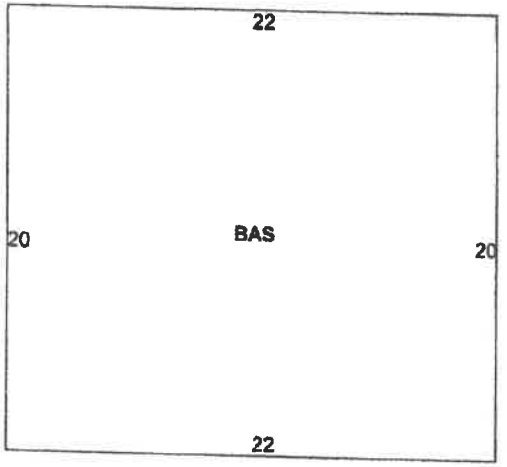
Element	Cd.	Ch.	Description

MIXED USE

Code	Description	Percentage
9310	Town C	100

COST/MARKET VALUATION

Adj. Base Rate:	86.67
	38,135
Net Other Adj:	0.00
Replace Cost	38,135
AYB	1991
EYB	1995
Dep Code	A
Remodel Rating	
Year Remodeled	
Dep %	25
Functional Obsinc	0
External Obsinc	0
Cost Trend Factor	1
Condition	
% Complete	
Overall % Cond	75
Apprais Val	28,600
Dep % Ovr	0
Dep Ovr Comment	
Misc Imp Ovr	0
Misc Imp Ovr Comment	
Cost to Cure Ovr	0
Cost to Cure Ovr Comment	

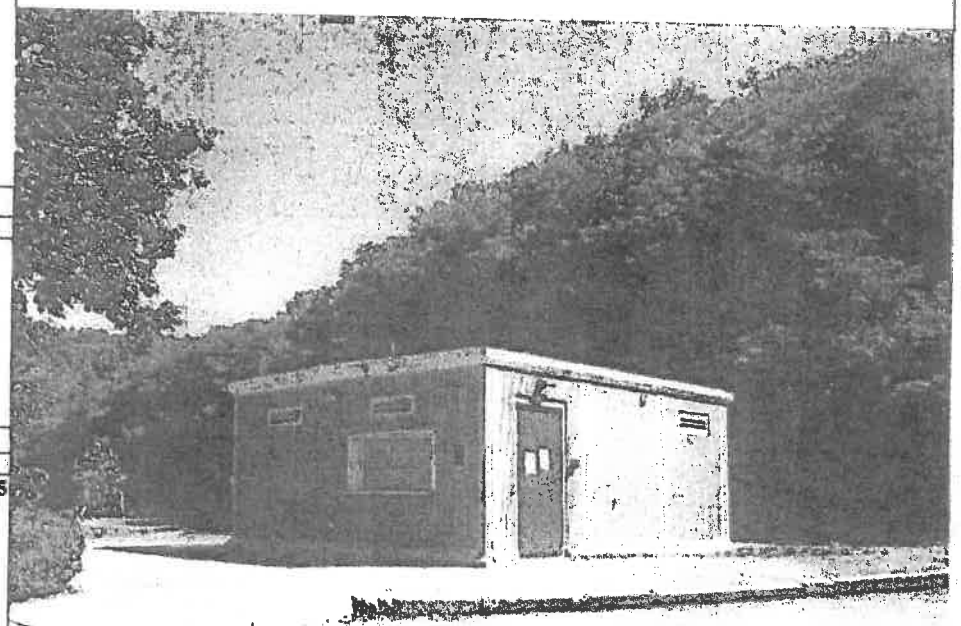


OB-OUTBUILDING & YARD ITEMS(L) / XF-BUILDING EXTRA FEATURES(B)

Code	Description	Sub	Sub Descript	L/B	Units	Unit Price	Yr	Gde	Dp Rt	Cnd	%Cnd	Apr Value
PAV1	PAV ASPH			L	36,875	3.70	1990		0		75	102,300
FN3	FENCE CHN 6			L	300	20.00	2007		0		50	3,000

BUILDING SUB-AREA SUMMARY SECTION

Code	Description	Living Area	Gross Area	Eff. Area	Unit Cost	Undeprec. Value
BAS	First Floor	440	440	440	86.67	38,135
	Tot. Gross Liv/Lease Area:	440	440	440		38,135



07.27.2016

Property Location: 79 HIGH ST
Vision ID: 1139

Account #

MAP ID: 51/ / 226/ /

Bldg #: 1 of 1

Bldg Name: LAKE GARDNER DAM

Sec #: 1 of 1 Card 1 of 1

State Use: 9300

Print Date: 04/22/2021 11:

CURRENT OWNER

AMESBURY CITY OF
GARDNER LAKE DAM
TOWN HALL

AMESBURY, MA 01913
Additional Owners:

TOPO.	UTILITIES	STRT./ROAD	LOCATION
2 High	1 All Public	1 Paved	1 Urban
4 Rolling		6 Sidewalk	

SUPPLEMENTAL DATA

Other ID: 00016 00000 00003
Sub-Div
Spec.Cond.
OWNER OCCU
ABC
AB APPLIC #
GIS ID: M_245809_956675

Use Change
Original Lot
NOTES
STYLE
CHAPTER L

ASSOC PID#

CURRENT ASSESSMENT

Description	Code	Appraised Value	Assessed Value
EXM LAND	9300	318,800	318,800
EXEMPT	9300	1,215,000	1,215,000
		Total	1,533,800	1,533,800

101
AMESBURY, M

VISIO

RECORD OF OWNERSHIP

Owner	BK-VOL/PAGE	SALE DATE	q/u	v/i	SALE PRICE	V.C.
AMESBURY CITY OF		09/15/1967			0	

PREVIOUS ASSESSMENTS (HISTORY)

Yr.	Code	Assessed Value
2021	9300	318,800
2021	9300	1,215,000
	Total:	1,533,800

Yr.	Code	Assessed Value
2020	9300	318,800
2020	9300	1,230,000
	Total:	1,548,800

Yr.	Code	Assessed Value
2019	9300	273,
2019	9300	1,245,
	Total:	1,518,0

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EXEMPTIONS

Year	Type	Description	Amount
		Total:	

OTHER ASSESSMENTS

Code	Description	Number	Amount	Comm. Int.

ASSESSING NEIGHBORHOOD

NBHD/ SUB	NBHD Name	Street Index Name	Tracing	Batch
0001/A	LAKE GARDNER DAM			

NOTES

CONSTRUCTION TRAILER
REMOVED 2000

APPRAISED VALUE SUMMARY

Appraised Bldg. Value (Card)	
Appraised XF (B) Value (Bldg)	1,215,00
Appraised OB (L) Value (Bldg)	318,80
Appraised Land Value (Bldg)	0
Special Land Value	
Total Appraised Parcel Value	1,533,800
Valuation Method:	
Adjustment:	C
Net Total Appraised Parcel Value	0
	1,533,800

BUILDING PERMIT RECORD

Permit ID	Issue Date	Type	Description	Amount	Insp. Date	% Comp.	Date Comp.	Comments
00-516	05/17/2000	NC	New Construct	0	05/10/2001	100	06/30/2001	TEMP CONST TRLR

VISIT/ CHANGE HISTORY

Date	Type	IS	ID	Cd.	Purpose/Result
07/27/2016			CW	EI	Exterior Inspection
09/17/2002			HF	BP	Building Permit
07/12/2001			HF	DE	DEMOLITION PERMIT
05/10/2001			HF	BP	Building Permit
08/29/2000			HF	BP	Building Permit

LAND LINE VALUATION SECTION

B #	Use Code	Use Description	Zone	D	Front	Depth	Units		Unit Price	I. Factor	S.A.	Acre Disc	C. Factor	ST. Idx	Adj.	Notes-Adj	Special Pricing		S Adj Fact	Adj. Unit Price	Land Value
																	Spec Use	Spec Calc			
1	9300	Town V	R8			250	40,946	SF	3.89	2.0000	U	1.0000	1.00		0.00				1.00	7.79	318,800
Total Card Land Units:							40,946	SF	Parcel Total Land Area:			40,946 SF								Total Land Value:	

Vacant

Description

Code	MIXED USE Description	Percentage
9300	Town V	100

COST/MARKET VALUATION

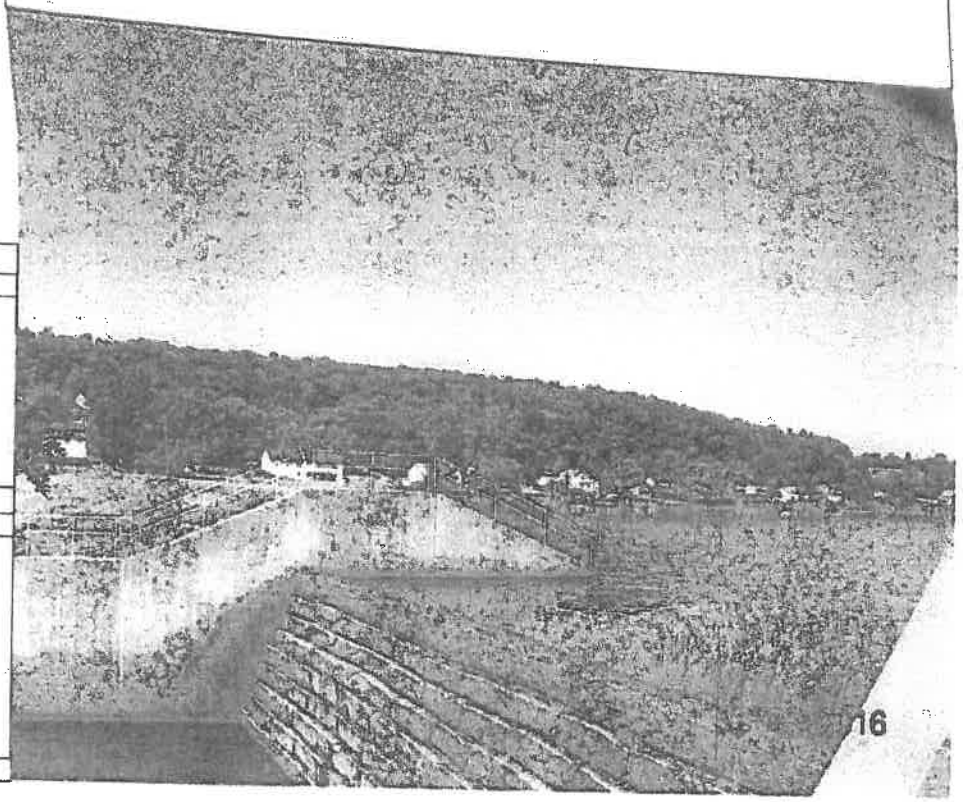
Adj. Base Rate:	0.00
Net Other Adj:	0
Replace Cost	0.00
AYB	0
EYB	
Dep Code	0
Remodel Rating	
Year Remodeled	
Dep %	
Functional Obslnc	
External Obslnc	
Cost Trend Factor	
Condition	
% Complete	
Overall % Cond	
Apprais Val	
Dep % Ovr	
Dep Ovr Comment	0
Misc Imp Ovr	
Misc Imp Ovr Comment	0
Cost to Cure Ovr	
Cost to Cure Ovr Comment	0

OB-OUTBUILDING & YARD ITEMS(L) / XF-BUILDING EXTRA FEATURES(B)

Code	Description	Sub	Sub Descript	L/B	Units	Unit Price	Yr	Gde	Dp Rt	Cnd	%Cnd	Apr Value
	EARTHEN DA			1.	1	1,500,000.	2001		1		100	1,215,000

BUILDING SUB-AREA SUMMARY SECTION

Code	Description	Living Area	Gross Area	Eff. Area	Unit Cost	Undeprec. Value
	Ttl. Gross Liv/Lease Area:	0	0	0		



Property Location: 79 HIGH ST
Vision ID: 1220 **Account #** **MAP ID:** 52/ / 37/ / **Bldg Name:**
Bldg #: 1 of 1 **Sec #:** 1 of 1 **Card** 1 **of** 1 **State Use:** 9300
Print Date: 04/22/2021 11:10

CURRENT OWNER	TOPO.	UTILITIES	STRT./ROAD	LOCATION
AMESBURY CITY OF TOWN SWIMMING AREA ENTRANCI TOWN HALL AMESBURY, MA 01913 Additional Owners:				

SUPPLEMENTAL DATA

Other ID: 00016 00000 00085	Use Change
Sub-Div	Original Lot
Spec.Cond.	NOTES
OWNER OCCU	STYLE
ABC	CHAPTER L
AB APPLIC #	
GIS ID: M_246060_956628	ASSOC PID#

CURRENT ASSESSMENT

Description	Code	Appraised Value	Assessed Value
EXM LAND	9300	107,000	107,000
		Total	107,000	107,000

101
AMESBURY, MA

VISION

RECORD OF OWNERSHIP

	BK-VOL/PAGE	SALE DATE	q/u	v/i	SALE PRICE	V.C.
AMESBURY CITY OF	06214/0527	01/03/1976			0	

PREVIOUS ASSESSMENTS (HISTORY)

Yr.	Code	Assessed Value	Yr.	Code	Assessed Value	Yr.	Code	Assessed Value
2021	9300	107,000	2020	9300	102,900	2019	9300	102,900
	Total:	107,000		Total:	102,900		Total:	102,900

EXEMPTIONS

Year	Type	Description	Amount
		Total:	

OTHER ASSESSMENTS

Code	Description	Number	Amount	Comm. Int.

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ASSESSING NEIGHBORHOOD

NBHD/ SUB	NBHD Name	Street Index Name	Tracing	Batch
0001/A				

NOTES

125X90% VACANT

APPRAISED VALUE SUMMARY

Appraised Bldg. Value (Card)	0
Appraised XF (B) Value (Bldg)	0
Appraised OB (L) Value (Bldg)	0
Appraised Land Value (Bldg)	107,000
Special Land Value	0
Total Appraised Parcel Value	107,000
Valuation Method:	C
Adjustment:	0
Net Total Appraised Parcel Value	107,000

BUILDING PERMIT RECORD

Permit ID	Issue Date	Type	Description	Amount	Insp. Date	% Comp.	Date Comp.	Comments

VISIT/ CHANGE HISTORY

Date	Type	IS	ID	Cd.	Purpose/Result
07/27/2016			CW	DB	Drive By
04/07/1980			78	10	Letter sent

LAND LINE VALUATION SECTION

B #	Use Code	Use Description	Zone	D	Front	Depth	Units		Unit Price	I. Factor	S.A.	Acre Disc	C. Factor	ST. Idx	Adj.	Notes- Adj	Special Pricing: Spec Use	Special Pricing: Spec Calc	S Adj Fact	Adj. Unit Price	Land Value
1	9300	Town V	OSC		50	125	5,800	SF	18.45	1.0000	5	1.0000	1.00		0.00				1.00	18.45	107,000

Total Card Land Units: 5,800 SF Parcel Total Land Area: 5,800 SF

Total Land Value: 107,000

Property Location: 79 HIGH ST

Vision ID: 1220 | **Account #** | **MAP ID: 52/ / 37/ /** | **Bldg #: 1 of 1** | **Bldg Name:** | **Sec #: 1 of 1** | **Card 1 of 1** | **State Use: 9300** | **Print Date: 04/22/2021 11:10**

CONSTRUCTION DETAIL

Element	Cd.	Ch.	Description
Model	00		Vacant

CONSTRUCTION DETAIL (CONTINUED)

Element	Cd.	Ch.	Description

MIXED USE

Code	Description	Percentage
9300	Town V	100

COST/MARKET VALUATION

Adj. Base Rate:	0.00
	0
Net Other Adj:	0.00
Replace Cost	0
AYB	
EYB	0
Dep Code	
Remodel Rating	
Year Remodeled	
Dep %	
Functional Obsinc	
External Obsinc	
Cost Trend Factor	1
Condition	
% Complete	
Overall % Cond	
Apprais Val	
Dep % Ovr	0
Dep Ovr Comment	
Misc Imp Ovr	0
Misc Imp Ovr Comment	
Cost to Cure Ovr	0
Cost to Cure Ovr Comment	

No Photo On Record

OB-OUTBUILDING & YARD ITEMS(L) / XF-BUILDING EXTRA FEATURES(B)

Code	Description	Sub	Sub Descript	L/B	Units	Unit Price	Yr	Gde	Dp Rt	Cnd	%Cnd	Apr Value

BUILDING SUB-AREA SUMMARY SECTION

Code	Description	Living Area	Gross Area	Eff. Area	Unit Cost	Undeprec. Value
	Tot. Gross Liv/Lease Area:	0	0	0		

Property Location: 79 HIGH ST
Vision ID: 1224
Account #
MAP ID: 52/ / 38/ /
Bldg #: 1 of 1
Bldg Name:
Sec #: 1 of 1 **Card** 1 of 1
State Use: 9300
Print Date: 04/22/2021 10:33

CURRENT OWNER
AMESBURY CITY OF
TOWN SWIMMING AREA ENTRANCI
TOWN HALL

AMESBURY, MA 01913
Additional Owners:

TOPO.	UTILITIES	STRT./ROAD	LOCATION

SUPPLEMENTAL DATA

Other ID: 00016 00000 00089	Use Change
Sub-Div	Original Lot
Spec.Cond.	NOTES
OWNER OCCU	STYLE
ABC	CHAPTER L
AB APPLIC #	
GIS ID: M_246048_956662	ASSOC PID#

CURRENT ASSESSMENT

Description	Code	Appraised Value	Assessed Value
EXM LAND	9300	101,500	101,500
		Total	101,500	101,500

101
AMESBURY, MA

VISION

RECORD OF OWNERSHIP
AMESBURY CITY OF

BK-VOL/PAGE	SALE DATE	q/u	v/i	SALE PRICE	V.C.
				0	

PREVIOUS ASSESSMENTS (HISTORY)

Yr.	Code	Assessed Value	Yr.	Code	Assessed Value	Yr.	Code	Assessed Value
2021	9300	101,500	2020	9300	97,600	2019	9300	97,600
		Total: 101,500			Total: 97,600			Total: 97,600

EXEMPTIONS

Year	Type	Description	Amount
		Total:	

OTHER ASSESSMENTS

Code	Description	Number	Amount	Comm. Int.

This signature acknowledges a visit by a Data Collector or Assessor

ASSESSING NEIGHBORHOOD

NBHD/ SUB	NBHD Name	Street Index Name	Tracing	Batch
0001/A				

NOTES
125X90% VACANT

APPRAISED VALUE SUMMARY

Appraised Bldg. Value (Card)	0
Appraised XF (B) Value (Bldg)	0
Appraised OB (L) Value (Bldg)	0
Special Land Value	101,500
Total Appraised Parcel Value	0
Valuation Method:	101,500
	C
Adjustment:	0
Net Total Appraised Parcel Value	101,500

BUILDING PERMIT RECORD

Permit ID	Issue Date	Type	Description	Amount	Insp. Date	% Comp.	Date Comp.	Comments

VISIT/ CHANGE HISTORY

Date	Type	IS	ID	Cd.	Purpose/Result
07/27/2016			CW	DB	Drive By
04/10/1980			78	10	Letter sent

LAND LINE VALUATION SECTION

B #	Use Code	Use Description	Zone	D	Front	Depth	Units		Unit Price	I. Factor	S.A.	Acre Disc	C. Factor	ST. Idx	Adj.	Notes- Adj	Special Pricing: Spec Use	Special Pricing: Spec Calc	S Adj Fact	Adj. Unit Price	Land Value
1	9300	Town V	OSC		50	100	3,540	SF	28.68	1.0000	5	1.0000	1.00		0.00				1.00	28.68	101,500

Total Card Land Units: 3,540 SF | Parcel Total Land Area: 3,540 SF | Total Land Value: 101,500

Property Location: 79 HIGH ST
Vision ID: 1224
Account #
MAP ID: 52/ / 38/ /
Bldg #: 1 of 1
Bldg Name:
Sec #: 1 of 1 **Card** 1 of 1
State Use: 9300
Print Date: 04/22/2021 10:33

CONSTRUCTION DETAIL

Element	Cd.	Ch.	Description
Model	00		Vacant

CONSTRUCTION DETAIL (CONTINUED)

Element	Cd.	Ch.	Description

MIXED USE

Code	Description	Percentage
9300	Town V	100

COST/MARKET VALUATION

Adj. Base Rate:	0.00
	0
Net Other Adj:	0.00
Replace Cost	0
AYB	
EYB	0
Dep Code	
Remodel Rating	
Year Remodeled	
Dep %	
Functional Obsinc	
External Obsinc	
Cost Trend Factor	0
Condition	
% Complete	
Overall % Cond	
Apprais Val	
Dep % Ovr	0
Dep Ovr Comment	
Misc Imp Ovr	0
Misc Imp Ovr Comment	
Cost to Cure Ovr	0
Cost to Cure Ovr Comment	

OB-OUTBUILDING & YARD ITEMS(L) / XF-BUILDING EXTRA FEATURES(B)

Code	Description	Sub	Sub Descript	L/B	Units	Unit Price	Yr	Gde	Dp Rt	Cnd	%Cnd	Apr Value

BUILDING SUB-AREA SUMMARY SECTION

Code	Description	Living Area	Gross Area	Eff. Area	Unit Cost	Undeprec. Value
	Ttl. Gross Liv/Lease Area:	0	0	0		

No Photo On Record

ABUTTERS LISTING for 79 HIGH ST - 51/226, 52/37, 52/38, 39/2 - 300'
AMESBURY, MA

AV PID	Map	Lot	Unit	Location	Owner's Name	Co_Owner's Name	Address	City	ST	Zip	B
1292	39	9		10 ESSEX ST	MAZZAGLIA DIANE		10 ESSEX ST	AMESBURY	MA	01913	3
1282	39	17		11 ESSEX ST	BURR JEFFREY	LISA BURR	11 ESSEX ST	AMESBURY	MA	01913	1
1293	52	44		12 ESSEX ST	RENE TREISER BROWN REVOCABLE T	RENE TRESIER TRUSTEE	12 ESSEX ST	AMESBURY	MA	01913	3
1223	39	5		13 ESSEX ST	COSSETTE BRIAN J	JESSICA COER	13 ESSEX ST	AMESBURY	MA	01913	3
1222	52	40		15 ESSEX ST	FREEMAN LISA A	JASON FOOTE J/T	15 ESSEX ST	AMESBURY	MA	01913	3
1294	52	43		16 ESSEX ST	SNYDER JONATHAN A	MELISSA A SNYDER T/E	16 ESSEX ST	AMESBURY	MA	01913	3
1221	52	41		19 ESSEX ST	SINGER MICHAEL G		19 ESSEX ST	AMESBURY	MA	01913	1
1296	52	45		67 HIGH ST	CAMILLIERE III JOSEPH J	DONNA PRESSLY CAMILLIERE T/E	67 HIGH ST	AMESBURY	MA	01913	1
1295	52	42		69 HIGH ST	MANNY ONE REALTY LLC		49 TURKEY HILL RD	AMESBURY	MA	01913	1
1209	52	62		70 HIGH ST	CROSSMAN RAYMOND	NICOLE CROSSMAN T/E	70 HIGH ST	WEST NEWBURY	MA	01985	3
1210	52	63		72 HIGH ST	ROLAND P DELIBERTIS REVOCABLE	ROLAND P DELIBERTIS JR (TRUSTE	72 HIGH ST	AMESBURY	MA	01913	2
1211	52	64		76 HIGH ST	HARRIS LEANDER A	RUTH A HARRIS	76 HIGH ST	AMESBURY	MA	01913	3
1139	51	226		79 HIGH ST	AMESBURY CITY OF	GARDNER LAKE DAM	TOWN HALL	AMESBURY	MA	019131	0
1229	39	2		79 HIGH ST	AMESBURY CITY OF	TOWN SWIMMING AREA	TOWN HALL	AMESBURY	MA	01913	
1220	52	37		79 HIGH ST	AMESBURY CITY OF	TOWN SWIMMING AREA ENTRANCE	TOWN HALL	AMESBURY	MA	01913	5
1224	52	38		79 HIGH ST	AMESBURY CITY OF	TOWN SWIMMING AREA ENTRANCE	TOWN HALL	AMESBURY	MA	01913	0
1212	52	65		80 HIGH ST	MCBRIEN BRUCE A	MCBRIEN JANET A T/E	80 HIGH ST	AMESBURY	MA	01913	
1308	52	14		81 HIGH ST #8	CRAFTS STEVEN		5 RAMSDELL WAY	AMESBURY	MA	01913	1
1321	52	27		81 HIGH ST #21	MACDONALD ALICIA	JOSEPH MACDONALD T/E	65 R THURLOW STREET	LYNNFIELD	MA	01940	3
1327	52	33		81 HIGH ST #27	TRINH THUC MINH	VAN THUY NGUYEN (T/E)	435 ELLIOT ST	GEORGETOWN	MA	01833	1
1317	52	23		81 HIGH ST #17	PUOPOLO REALTY TRUST OF GROVEL	STEVEN & KAREN PUOPOLO (TRUSTE	11 UPTACK ROAD	BEVERLY	MA	01915	3
1313	52	19		81 HIGH ST #13	BACHA KAMAL		81 HIGH STREET	GROVELAND	MA	01834	3
1306	52	12		81 HIGH ST #6	MARDEN MARK		4 DEBRA RD	AMESBURY	MA	01913	3
1307	52	13		81 HIGH ST #7	NIKITAS DIMITRIOS		5 AQUA WAY	KINGSTON	NH	03848	3
1329	52	35		81 HIGH ST #29	WHEELER PARKER	LAVERNE BEAUSEY WHEELER	81 HIGH ST #29	SALEM	NH	03073	3
1320	52	26		81 HIGH ST #20	MIGOS VASILIOS	DEMETRA MIGOS	530 QUARRY ROAD	AMESBURY	MA	01913	3
1324	52	30		81 HIGH ST #24	ZOLONDICK CAROL ZIEBARTH	C/O LIAM HOARE	12-14 31ST AVE APT9	WELLS	ME	04090	3
1325	52	31		81 HIGH ST #25	PHILIP JAMES SCHENA REVOCABLE	PHILIP JAMES SCHENA TRUSTEE	81 HIGH ST U.25	ASTORIA	NY	11106	3
1301	52	7		81 HIGH ST #1	JENNA REALTY LIMITED LIABILITY	C/O ALLAN SABATINO	P.O. BOX 550	AMESBURY	MA	01913	2
1312	52	18		81 HIGH ST #12	JENNA REALTY LLC	C/O ALLAN SABATINO	P.O. BOX 550	SEABROOK	NH	03874	2
1318	52	24		81 HIGH ST #18	PITZI MARK	STEVEN CRAFTS (T/C)	118 SYLVAN STREET	SEABROOK	NH	03874	2
1323	52	29		81 HIGH ST #23	GRANT CATHERINE	TRUSTEE OF THE GRANT FAMILY RE	1 WINDWARD DR	DANVERS	MA	01923	3
1322	52	28		81 HIGH ST #22	CHIDLEY MARC	CAROL CHIDLEY (T/E)	81 HIGH ST 22	NEWBURYPORT	MA	01950	3
								AMESBURY	MA	01913	3

ABUTTERS LISTING for 79 HIGH ST - 51/226, 52/37, 52/38, 39/2 - 300'
AMESBURY, MA

AV PID	Map	Lot	Unit	Location	Owner's Name	Co_Owner's Name	Address	City	ST	Zip	B
1328	52	34		81 HIGH ST #28	LACIVITA ROCCO		81 HIGH ST 28	AMESBURY	MA	01913	3
1319	52	25		81 HIGH ST #19	DOUGLAS AND DAPHNE ARAUJO (JT)		217 ESSEX STREET #1	SAUGUS	MA	01906	3
1330	52	36		81 HIGH ST #30	ARAUJO ROSANGELA	CARLOS ROBERTO ARAUJO (T/E)	217 ESSEX STREET #1	SAUGUS	MA	01906	3
1311	52	17		81 HIGH ST #11	PITZI MARK	STEVEN CRAFTS (T/C)	118 SYLVAN STREET	DANVERS	MA	01923	3
1310	52	16		81 HIGH ST #10	FRANCISQUE RICHAZAIRE	GLADYS FRANCISQUE (T/E)	81 HIGH ST 10	AMESBURY	MA	01913	3
1309	52	15		81 HIGH ST #9	CRAFTS STEVEN		5 RAMSDELL WAY	LYNNFIELD	MA	01940	3
1314	52	20		81 HIGH ST #14	MARDEN MARK		4 DEBRA RD	KINGSTON	NH	03848	1
1326	52	32		81 HIGH ST #26	CROW JUNE		81 HIGH ST 26	AMESBURY	MA	01913	3
1305	52	11		81 HIGH ST #5	HARPER DIANE M	C/O RICHARD P PESCE & KELLY A	65 BAKER RD	SALISBURY	MA	01952	2
1304	52	10		81 HIGH ST #4	MARDEN MARK E		4 DEBRA RD	KINGSTON	NH	03848	1
1303	52	9		81 HIGH ST #3	SULESKI STEVEN E	SULESKI PATRICIA A T/E	PO BOX 201	W BOXFORD	MA	018850	1
1316	52	22		81 HIGH ST #16	ZERO THOMAS M JR		22 WRIGHT AVENUE	MEDFORD	MA	02155	3
1315	52	21		81 HIGH ST #15	MAZOR ELIASHIV	C/O MODERN PROPERTY SOLUTIONS	100 TRADE CENTER	WOBURN	MA	01801	1
1302	52	8		81 HIGH ST #2	MARDEN MARK E		4 DEBRA RD	KINGSTON	NH	03848	1
1213	52	66		86 HIGH ST	KEZER JEREMY	KIMBERLY KEZER T/E	86 HIGH ST	AMESBURY	MA	01913	1
1215	52	67		88 HIGH ST	TRUSTEE OF THE MARK T LYNCH RE	C/O MARK T LYNCH	88 HIGH ST	AMESBURY	MA	01913	3
1216	52	68		90 HIGH ST	DAINIEL KRASA LIVING TRUST	TATJANA MESCHEDE LIVING TRUST	219 LANGLEY RD	NEWTON	MA	02159	3
1218	52	5		91 HIGH ST	ALKIM LLC		479 E BROADWAY	HAVERHILL	MA	01830	1
1149	52	4		95 HIGH ST	ROSE FRANCIS SCOTT		32 SALCOMBE STREET	DORCHESTER	MA	02125	1
1148	52	3		101 HIGH ST	LE CHRISTINA		31 CURRY CR	SWAMPSCOTT	MA	01907	3
1146	52	2		103 HIGH ST	VIGNEAULT JOSEPH M	VALERIE M VIGNEAULT J/T	103 HIGH ST	AMESBURY	MA	01913	1
1145	52	1		105 HIGH ST	RYAN ELISABETH		105 HIGH ST	AMESBURY	MA	01913	3
1143	51	224		109 HIGH ST	AITKEN WILLIAM D II	KATHLEEN M AITKEN T/E	109 HIGH ST	AMESBURY	MA	01913	3
1214	52	113		86.5 HIGH ST	DANFORTH DEBRA		86.5 HIGH ST	AMESBURY	MA	01913	3
1198	52	116		33 THOMPSON ST	KELLEY SUSAN	KEVIN O KELLEY (T/E)		AMESBURY	MA	01913	3
1197	52	115		37 THOMPSON ST	NADEAU DONALD J		37 THOMPSON ST	AMESBURY	MA	01913	3
104042	52	114	A	41 THOMPSON ST #A	JOYCE JANE M		41 THOMPSON ST #A	AMESBURY	MA	01913	0
104043	52	114	B	43 THOMPSON ST #B	KELLEY HERBERT C	KELLEY BETH A T/E	43 THOMPSON ST #B	AMESBURY	MA	01913	2
4673	51	210		58 WHITEHALL RD	CARVEN III JOSEPH F	JULIE A CARVEN T/E	58 WHITEHALL RD	AMESBURY	MA	01913	2
6884	51	222	A	59 WHITEHALL RD	MORSE JESSICA M	TIMOTHY D MORSE	59 WHITEHALL RD	AMESBURY	MA	01913	1
1141	51	222		61 WHITEHALL RD	WILLIAM & PRUDENCE MORSE (LIFE	PETER, JEFFREY AND TIMOTHY MOR	61 WHITEHALL RD	AMESBURY	MA	01913	3
4674	51	211		62 WHITEHALL RD	LOGAN ANDREW J	JENNIFER V LOGAN T/E	62 WHITEHALL RD	AMESBURY	MA	01913	3
1140	51	221		63 WHITEHALL RD	NADEAU DENIS A	HELEN M NADEAU T/E	63 WHITEHALL RD	AMESBURY	MA	01913	1

ABUTTERS LISTING for 79 HIGH ST - 51/226, 52/37, 52/38, 39/2 - 300'
AMESBURY, MA

AV PID	Map	Lot	Unit	Location	Owner's Name	Co_Owner's Name	Address	City	ST Zip	B
4677	51	212		64 WHITEHALL RD	MCCARTHY WILLIAM J	ELIZABETH G MCCARTHY L/EST	64 WHITEHALL RD	AMESBURY	MA 01913	1
6840	51	221	A	65 WHITEHALL RD	TORRES TINA M		65 WHITEHALL RD	AMESBURY	MA 01913	3
1138	51	220		69 WHITEHALL RD	ROGERS JR JOHN S	LYNNE P ROGERS T/E	69 WHITEHALL RD	AMESBURY	MA 01913	1
4675	51	213		70 WHITEHALL RD	WRIGHT STEPHEN J		70 WHITEHALL RD	AMESBURY	MA 01913	1
1137	38	11		75 WHITEHALL RD	CYNEWSKI STEVEN D	KATHLEEN A SCOTT T/E	75 WHITEHALL RD	AMESBURY	MA 01913	3
1279	39	19		5 WOODLAWN ST	OAKES BRETT	THERESA OAKES T/E	5 WOODLAWN ST	AMESBURY	MA 01913	2
1281	39	18		9 WOODLAWN ST	TROIANO JOSEPH R	ANNMARIE F ALVAREZ T/E	9 WOODLAWN ST	AMESBURY	MA 01913	3
1231	39	25		10 WOODLAWN ST	ANASTASI DAVID	LAURA BURKE	10 WOODLAWN ST	AMESBURY	MA 01913	3
1230	39	26		12 WOODLAWN ST	FAHEY JOSEPH W	ROBIN L FAHEY T/E	12-14 WOODLAWN ST	AMESBURY	MA 01913	1
100983	39	26	A	12 WOODLAWN ST #A	FAHEY JOSEPH W	ROBIN L FAHEY T/E	12-14 WOODLAWN ST	AMESBURY	MA 01913	1
1225	39	7		16 WOODLAWN ST	RILEY MARK	TATIANA RILEY T/E	16 WOODLAWN ST	AMESBURY	MA 01913	1

Parcel Count: 77

THE BOARD OF ASSESSORS OF THE TOWN OF AMESBURY, MA HEREBY CERTIFIES THAT THIS LIST OF ABUTTERS IS THE MOST RECENT APPLICABLE TAX LIST AS REQUIRED BY CHAPTER 40A, SECTION 11 OF THE MASSACHUSETTS GENERAL LAWS AS AMENDED

Dana Criswell 4-22-21

NOTIFICATION TO ABUTTERS

UNDER THE MASSACHUSETTS WETLANDS PROTECTION ACT AND AMESBURY WETLANDS PROTECTION BYLAW

In accordance with the Massachusetts General Laws, Chapter 131, Section 40, and the Amesbury Wetlands Protection Bylaw, you area hereby notified of the following:

The Amesbury Conservation Commission will hold a public hearing on June 7, 2021 , at 6:30 pm, located virtual, to consider a Notice of Intent submitted by City of Amesbury Public Works to provide Lake Gardner Annual Beach Nourishment at Lake Gardner,79 High Street, Amesbury, MA.

Covid-19 Notice: This meeting will be conducted under the 'Executive Order Suspending Certain Provisions of the Open Meeting Law G.L. c.30A, §20, signed on March 12, 2020. The public can view this meeting on ACTV Channel 12, the ACTV website or the City of Amesbury Facebook Page: www.facebook.com/amesburyma

To submit a public comment, you can email conservation@amesburyma.gov or submit a comment on the Facebook Live feed, by beginning your comment with PUBLIC COMMENT.

Hearings begin at 6:30 p.m.. For more information concerning the date, time or place of hearing, contact the Conservation Commission at 978-388-8110. Arrangements to examine copies of the filling may be made by calling the Conservation Commission at 978-388-8110. Copies may be available for a fee.

NOTE: Notice of the public hearing, including its date, time, and place will be posted in Town Hall not less than 48 hours in advance.

NOTE: Notice of the public hearing, including its date, time, and place will be published in the Newburyport Daily News not less than 5 business days prior to the public hearing.

NOTE: You may also contact the Amesbury Conservation Commission or the Department of Environmental Protection (DEP) Wetlands Division- Northeast Regional Office (NERO) for more information about this application or the Wetlands Protection Act. The DEP, Northeast Regional Office can be reached at 617-654-6500.

LEGAL NOTIFICATION

AMESBURY CONSERVATION COMMISSION

In accordance with the Wetland Protection Act (Massachusetts General Law, Chapter 131, § 40 and the Amesbury Wetlands Protection Ordinance, (Article 34):

The applicant, City of Amesbury Public Works has filed a Notice of Intent

with the Amesbury Conservation Commission for the proposed Lake Gardner

Annual Beach Nourishment at 79 High Street, Lake Gardner, Amesbury, MA 01913.

A Public Hearing will be held vitual on Monday June 7, 2021 at 6:30 pm
at which time all persons and organizations having interest may be heard. Copies of the application may be examined and/or purchased
at the Conservation Commission office, 62 Friend Street, Amesbury, MA 01913. The application can also be viewed by visiting the Amesbury Conservation Commission website at
https://www.amesburyma.gov/conservation-commission/pages/conservation-commission-projects-2021

Regards,

Tim Broadrick, Chair
AMESBURY CONSERVATION COMMISSION

Covid-19 Notice: This meeting will be conducted under the 'Executive Order Suspending Certain Provisions of the Open Meeting Law G.L. c.30A, §20, signed on March 12, 2020. The public can view this meeting on ACTV Channel 12, the ACTV website or the City of Amesbury Facebook Page: www.facebook.com/amesburyma

To submit a public comment, you can email conservation@amesburyma.gov or submit a comment on the Facebook Live feed, by beginning your comment with PUBLIC COMMENT.

Publish: (No later than five (5) days prior to public hearing)

Please send invoice to:

Dept of Public Works
39 South Hunt Road
Amesbury, MA 01913
Telephone / Cell: 978 388 8116
E-mail Address: mary@amesburyma.gov

COMPREHENSIVE ENVIRONMENTAL INC.
21 DEPOT STREET
MERRIMACK, NH 03054

CITIZENS BANK
NEW HAMPSHIRE

54-153/114

024945

9/13/2019

PAY TO THE ORDER OF COMM OF MA - NHESP $ **300.00

Three Hundred and 00/100********** DOLLARS

WZ/458721-04-18

COMMONWEALTH OF MA - NHESP
DIVISION OF FISH AND WILDLIFE
1 RABBIT HILL ROAD
WESTBOROUGH, MA 01581

MEMO

Erin Paut

⑈024945⑈ ⑆011401533⑆ 330727736⑈

THE BACK OF THIS DOCUMENT CONTAINS CHECK SECURITY WATERMARK AND COIN REACTIVE INK

COMPREHENSIVE ENVIRONMENTAL INC. 024945

COMM OF MA - NHESP 9/13/2019

Fees (1@$300.00)	300.00

Citizens-Checking Acc	300.00

Enter your transmittal number → X287823 Transmittal Number

Your unique Transmittal Number can be accessed online:
http://www.mass.gov/eea/agencies/massdep/service/approvals/transmittal-form-for-payment.html

Massachusetts Department of Environmental Protection

Transmittal Form for Permit Application and Payment

1. Please type or print. A separate Transmittal Form must be completed for each permit application.

2. Make your check payable to the Commonwealth of Massachusetts and mail it with a copy of this form to: MassDEP, P.O. Box 4062, Boston, MA 02211.

3. Three copies of this form will be needed.

Copy 1 - the original must accompany your permit application. **Copy 2** must accompany your fee payment. **Copy 3** should be retained for your records

4. Both fee-paying and exempt applicants must mail a copy of this transmittal form to:

MassDEP
P.O. Box 4062
Boston, MA
02211

*** Note:**
For BWSC Permits, enter the LSP.

A. Permit Information

Form 3 NOI
1. Permit Code: 4 to 7 character code from permit instructions

WPA
2. Name of Permit Category

Beach Nourishment (inland)
3. Type of Project or Activity

B. Applicant Information – Firm or Individual

City of Amesbury Public Works
1. Name of Firm - Or, if party needing this approval is an individual enter name below:

2. Last Name of Individual | 3. First Name of Individual | 4. MI

39 South Hunt Road
5. Street Address

Amesbury | MA | 01913 | 978-388-8116 | 10. Ext. #
6. City/Town | 7. State | 8. Zip Code | 9. Telephone #

Robert Desmarais
11. Contact Person

12. e-mail address

C. Facility, Site or Individual Requiring Approval

Lake Gardner Beach
1. Name of Facility, Site Or Individual

79 High Street
2. Street Address

Amesbury | MA | 01913 | 6. Telephone # | 7. Ext. #
3. City/Town | 4. State | 5. Zip Code

8. DEP Facility Number (if Known) | 9. Federal I.D. Number (if Known) | 10. BWSC Tracking # (if Known)

D. Application Prepared by (if different from Section B)*

Comprehensive Environmental Inc.
1. Name of Firm Or Individual

21 Depot Street
2. Address

Merrimack | NH | 03054 | 603-424-0564 | 7. Ext. #
3. City/Town | 4. State | 5. Zip Code | 6. Telephone #

Stephanie Hanson
8. Contact Person

9. LSP Number (BWSC Permits only)

E. Permit - Project Coordination

1. Is this project subject to MEPA review? ☐ yes ☒ no
If yes, enter the project's EOEA file number - assigned when an Environmental Notification Form is submitted to the MEPA unit:

EOEA File Number

F. Amount Due

DEP Use Only

Permit No:

Rec'd Date:

Reviewer:

Special Provisions:

1. ☒ Fee Exempt (city, town or municipal housing authority)(state agency if fee is $100 or less).
There are no fee exemptions for BWSC permits, regardless of applicant status.
2. ☐ Hardship Request - payment extensions according to 310 CMR 4.04(3)(c).
3. ☐ Alternative Schedule Project (according to 310 CMR 4.05 and 4.10).
4. ☐ Homeowner (according to 310 CMR 4.02).

Check Number | Dollar Amount | Date